OCTOBER
1955
50¢

CQ RADIO AMATEURS' JOURNAL

THE NC-300 "DREAM" RECEIVER
THE CQ WORLD GLOBE BARGAIN

exclusive

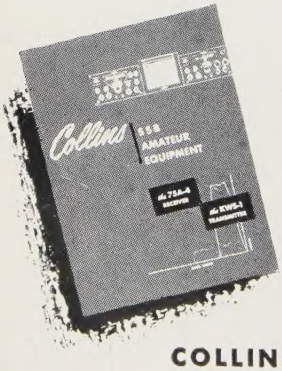
in the Amateur Field . . .

Collins

75A-4 RECEIVER

latest in the 75A series is *unmatched* in Amateur reception because of such outstanding features as these *exclusive* with Collins

- Q-MULTIPLIER for superior rejection of heterodyne interference
- PASSBAND TUNING for switching sideb bands and dodging interfering signals
- AVC on SSB and CW as well as AM
- LINEAR OSCILLATOR provides 1 kc dial ca bration on all Ham bands
- DUAL DETECTORS for low distortion sideb reception
- MECHANICAL FILTER for best skirt selecti (three selectable filters available at slight extra cost)
- DUAL CONVERSION crystal controlled for excel stability



Write or visit your nearest Collins distributor for complete information on Collins new SSB line, and ask for your copy of this latest brochure.

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

COLLINS

Calibration on the nose . . .

thanks to PR's 100 K.C. FREQUENCY STANDARD

A dependable secondary frequency standard is a MUST for today's amateur station . . . to determine band-edge . . . to keep the VFO and receiver properly calibrated. Now you can buy a really dependable, commercial-quality PR 100 Kc. Crystal at reasonable cost. The Type Z-6A is hermetically sealed, razor-accurate, unconditionally guaranteed. Get it at your jobber.

Z-6A
100 K.C.
$6.95 net

PR Crystals

Since 1934

USE PR AND KNOW WHERE YOU ARE

PETERSEN RADIO COMPANY, INC.
2800 W. BROADWAY • COUNCIL BLUFFS, IOWA

why is the SX-96 the most wanted receiver on the air?

The Hallicrafters double conversion selectable side band receiver offers major improvements in stability by the addition of temperature compensation in the high frequency oscillator circuits and the use of crystal controlled second conversion oscillators. Hallicrafters highly selective 50 kc i-f system is used in this new precision-built receiver.

Coverage: Standard Broadcast, 538-1580 kc; Three S/W Bands, 1720 kc–34 Mc, Band 1: 538 kc–1580 kc–Band 2; 1720 kc–4.9 Mc–Band 3: 4.6 mc–13 mc–Band 4: 12 mc–34 mc.

Type of Circuit: Double conversion superheterodyne over the entire frequency range.

Type of Signals: AM-CW-SSB.

Features: Precision gear drives are used on both main tuning and band spread dials. Double conversion with selectable crystal controlled second oscillators. Selectable side band reception of both suppressed carrier and full carrier transmissions by front panel switch, delayed AVC, CW operation with AVC on or off. Calibrated bandspread, "S" meter, low drift, double conversion superhet.

Controls: Sensitivity, band selector, volume, tuning, AVC on/off, noise limiter on/off, AM/CW-SSB, Bandspread, selectivity, pitch control, response (pwr on/off, LSB, USB–2 tone pos.), receive-standby.

Intermediate Frequencies: 1650 kc and 50 kc.

Tuning Assembly and Dial Drive Mechanism: Separate 3 section tuning capacitor assemblies for main tuning and bandspread tuning. Circular main tuning dial has 0-100 logging scale. Bandspread dial is calibrated for the 80, 40, 20, 15, and 11-10 meter amateur bands.

Selectivity: Five steps of bandwidth calibration at 6 db points; 5 kc, 3 kc, 2 kc, 1 kc, and .5 kc.

Antenna Input Impedance: Balanced/unbalanced.

Headphone Output Impedance: Nominal 500 ohms.

Audio Output Impedance: 3.2/500 ohms.

Automatic Noise Limiter: Series noise limiter operated by toggle switch on front panel.

Carrier Level Indicator: Calibrated in "S" units from 1 to 9, decibles to 90 db over S9, microvolts from 1 to 1000 k.

External Connections: 3.2/500 ohm speaker terminals, terminals for single wire or doublet antenna, phono jack, AC power cord, socket for DC operation and remote control, audio output terminals, "S" meter electrical adjustment and mounting hole for co-axial cable connector. Phones jack on front panel.

Audio Power Output: 1.5 watts with 10% or less distortion.

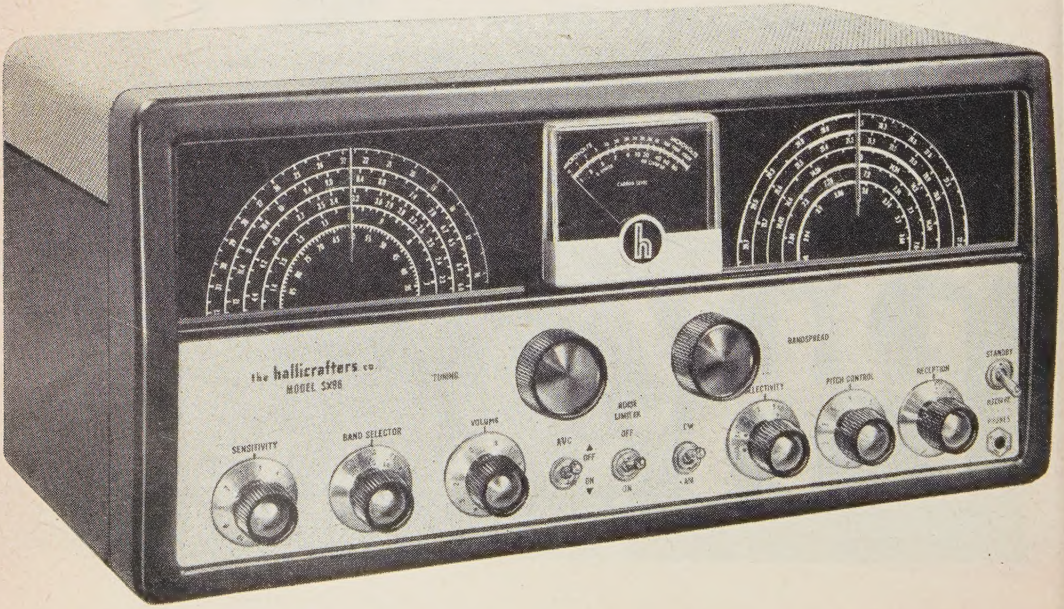
Power Supply: 105/125 V, 50/60 cycle AC.

Model SX-96–$249.95

Matching R-46B Speaker–$17.95

hallicrafters

4401 West Fifth Avenue
Chicago 24, Illinois



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POSTMASTER: SEND FORM 3579 to CQ, 67 WEST 44th ST., NEW YORK 36, N. Y.

New HEATHKIT DX-100 PHONE AND CW TRANSMITTER KIT

MODEL DX-100

Shpg. Wt. 120 lbs.

$189.50

Shipped motor freight unless otherwise specified. $50.00 deposit with C.O.D. orders.

- R.F. output 100 watts Phone, 125 watts CW.
- Built-in VFO, modulator, power supplies. Kit includes all components, tubes, cabinet and detailed construction manual.
- Crystal or VFO operation (crystals not included with kit).
- Pi network output, matches 50-600 ohms non-reactive load. Reduces harmonic output.
- Treated for TVI suppression by extensive shielding and filtering.
- Single knob bandswitching, 160 meters through 10 meters.
- Pre-punched chassis, well illustrated construction manual, high quality components used throughout—sturdy mechanical assembly.

This modern-design Transmitter has its own VFO and plate-modulator built in to provide CW or phone operation from 160 meters through 10 meters. It is TVI suppressed, with all incoming and out-going circuits filtered, plenty of shielding, and strong metal cabinet with interlocking seams. Uses pi network interstage and output coupling. R.F. output 100 watts phone, ... 125 watts CW. Switch-selection of VFO or 4 crystals (crystals not included).

Incorporates high quality features not expected at this price level. Copper plated chassis—wide-spaced tuning capacitors — excellent quality components throughout—illuminated VFO dial and meter face—remote socket for connection of external switch or control of an external antenna relay. Preformed wiring harness—concentric control shafts. Plenty of step-by-step instructions and pictorial diagrams.

All power supplies built-in. Covers 160, 80, 40, 20, 15, 11 and 10 meters with single-knob bandswitching. Panel meter reads Driver I_P Final I_G, I_P, and E_P, and Modulator I_P. Uses 6AU6 VFO, 12BY7 Xtal osc.-buffer, 5763 driver, and parallel 6146 final. 12AX7 speech amp., 12BY7 driver, push-pull 1625 modulators. Power supplies use 5V4 low voltage rect., 6AL5 bias rect., 0A2 VFO voltage reg., (2) 5R4GY hi voltage rect., and 6AQ5 clamp tube. R.F. output to coax. connector. Overall dimensions 20⅞" W x 13¾" H x 16" D.

Heathkit ANTENNA COUPLER KIT

MODEL AC-1

$14.50 Shpg. Wt. 4 lbs.

Poor matching allows valuable communications energy to be lost. The Model AC-1 will properly match your low power transmitter to an end-fed long wire antenna. Also attenuates signals above 36 Mc, reducing TVI. 52 ohm coax. input—power up to 75 watts—10 through 80 meters—tapped inductor and variable condenser—neon RF indicator—copper plated chassis and high quality components.

Heathkit GRID DIP METER KIT

MODEL GD-1B

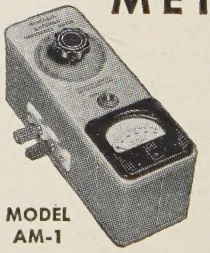
$19.50 Ship. Wt. 4 lbs.

The invaluable instrument for all Hams. Numerous applications such as pretuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, design procedures, etc. Receiver applications include measuring C, L and Q of components—determining RF circuit resonant frequencies.

Covers 80, 40, 20, 11, 10, 6, 2, and 1¼ meter Ham bands. Complete frequency coverage from 2—250 Mc, using ready-wound plug-in coils provided with the kit. Accessory coil kit, Part 341-A at $3.00 extends low frequency range to 350 Kc. Dial correlation curves furnished.

Compact construction, one hand operation, AC transformer operated, variable sensitivity control, thumb wheel drive, and direct reading calibrations. Precalibrated dial with additional blank dials for individual calibration. You'll like the ready convenience and smart appearance of this kit with its baked enamel panel and crackle finish cabinet.

Heathkit ANTENNA IMPEDANCE METER KIT



MODEL AM-1

$14.50 Shpg. Wt. 2 lbs.

Use the Model AM-1 in conjunction with a signal source for measuring antenna impedance, line matching purposes, adjustment of beam and mobile antennas, and to insure proper impedance match for optimum overall system operation. Will double, also, as a phone monitor or relative field strength indicator.

100 μa. meter employed. Covers the range from 0 to to 600 ohms. Cabinet is only 7" long, 2½" wide, and 3¼" deep. An instrument of many uses for the amateur.

HEATH COMPANY
A SUBSIDIARY OF DAYSTROM, INC.
BENTON HARBOR 12, MICHIGAN

New Heathkit VFO KIT

MODEL VF-1

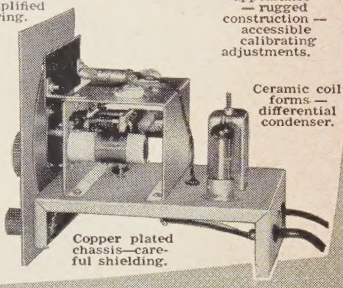
$19.50

Ship. Wt. 7 lbs.

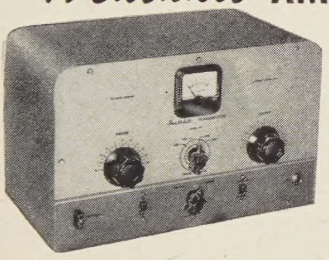
- Smooth acting illuminated and precalibrated dial.
- 6AU6 electron coupled Clapp oscillator and OA2 voltage regulator.
- 10 Volt average output on fundamental frequencies.
- 7 Band calibration, 160 through 10 meters, from 3 basic oscillator frequencies.

Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter. It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical and electrical design insures operating stability. Coils are wound on heavy duty ceramic forms, using Litz or double cellulose wire coated with polystyrene cement. Variable capacitor is of differential type construction, especially designed for maximum bandspread and features ceramic insulation and double bearings.

This kit is furnished with a carefully precalibrated dial which provides well over two feet of calibrated dial scale. Smooth acting vernier reduction drive insures easy tuning and zero beating. Power requirements 6.3 volts AC at .45 amperes and 250 volts DC at 15 mills. Just plug it into the power receptacle provided on the rear of the AT-1 Transmitter Kit. The VFO coaxial output cable terminates in plastic plug to fit standard ½" crystal holder. Construction is simple and wiring is easy.



Heathkit AMATEUR TRANSMITTER KIT



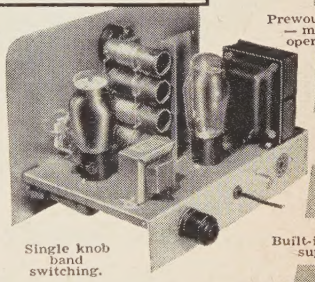
MODEL AT-1

$29.50

Ship. Wt. 16 lbs.

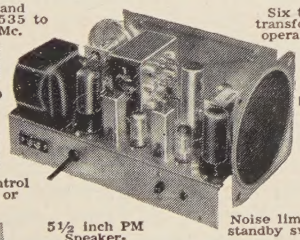
SPECIFICATIONS:

Range 80, 40, 20, 15, 11, 10 meters.
6AG7 .....Oscillator-multiplier.
6L6 .....Amplifier-doubler
5U4G ..... Rectifier.
105-125 Volt A.C. 50-60 cycles 100 watts. Size: 8⅛ inch high x 13⅛ inch wide x 7 inch deep.



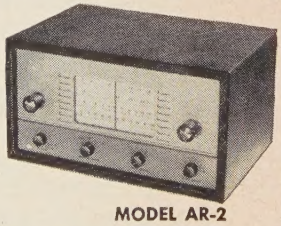
Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporaring many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, stand-by switch, key click filter, A. C. line filtering, good shielding, etc. VFO or crystal excitation—up to 35 watts input. Built-in power supply provides 425 volts at 100 MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis, and detailed construction manual.

Heathkit COMMUNICATIONS RECEIVER KIT



SPECIFICATIONS:

Range.....535 Kc to 35 Mc
12BE6 .....Mixer-oscillator
12BA6 .....I. F. Amplifier
12AV6 Detector—AVC—audio
12BA6 ....B. F. O. oscillator
12A6.....Beam power output
5Y3GT .....Rectifier
105-125 volts A.C. 50-60 cycles, 45 watts.



MODEL AR-2

$25.50

Ship. Wt. 12 lbs.

CABINET:

Proxylin impregnated fabric covered plywood cabinet. Shipg. weight 5 lbs. Number 91-10, $4.50.

A new Heathkit AR-2 communications receiver. The ideal companion piece for the AT-1 Transmitter. Electrical bandspread scale for tuning and logging convenience. High gain miniature tubes and IF transformers for high sensitivity and good signal to noise ratio. Construct your own Communications Receiver at a very substantial saving. Supplied with all tubes, punched and formed sheet metal parts, speaker, circuit components, and detailed step-by-step construction manual.

HEATH COMPANY
BENTON HARBOR 12, MICHIGAN

Feenix, Ari

Deer Hon. Ed:

Yes indeedy, it only taking one or to coo days (it getting down to seventy-five degree here yestiddy) and I are thinking of Dee-X Calling seek-you Yurrup, calling seek-yo Yurrup. Boy oh boys, that are the reel thrill.

Only one trubbles. Scratchi are temporaril off air on acct. of bad case of gassy final toob It are while I worrying about this that are ge ting grate idea. Why not having some way s getting credit for Dee-X without working i After all, if having good rig, good antenna, wh bothering to work Dee-X? You knowing yo can doing it.

Now, this are where you coming in. Wit reputayshun of your Hon. Mag. it being n trubbles to putting this across. We can callin it WACOP—Worked All Countries on Pape Not that this are easy, no indeedy.

In order to making WACOP, amchoor hav ing to doing like this. First of all he filling ou long form, answering all sorts questions abou his stayshun. First he saying what power h having in final, and what efishensees he getting Next he telling all about antenna, such as gai direckshun it pointing, whether he can rotatin it, and so ons.

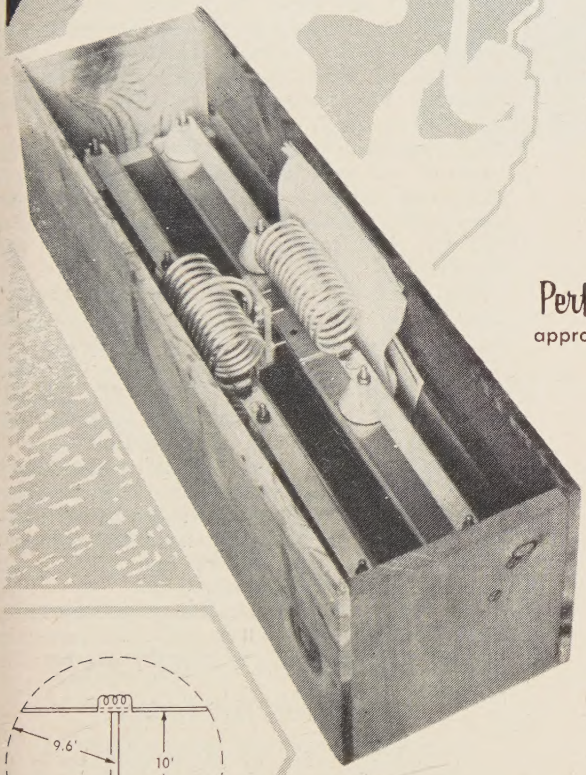
Next he describing reseever, giving figures fo sensitivity on each bands, overall selectivity, an even telling what kind antenna he using o reseever and whether it having lotsa gain an which direckshun.

Now the amchoor sending all forms to you and you are checking for rite answers. Fo examples, must have at least 750 whats t final, must having antenna gain of at leasts deebee, must having reseever with five micro volts sensitivity, and all likes that.

Now, if answers all okey, amchoor mus coming to you for operator examinayshun. Thi are in to parts, sending and reseeving for see-v and fone. For foney men you taking amchoo to Grand Central Stayshun at 5 pm and yo standing on one side and he on the other. Now you yelling long message and amchoor ar having to copy thru all QRM of peeples talkin and trains leeving and redcaps yelling an

[*Continued on page 8*]

THE CASE OF THE BANTAM



There is indeed such a case but there's nothing mysterious about it. This case contains the high "Q" coil assemblies, the "Heart" of the widely acclaimed, 15 and 20 meter Gonset Bantam Beams.

No flimsy, crushable cardboard here. Instead, a sturdy wooden case with interior supports to which the assemblies are firmly secured by wood screws. With this case, "Pre-tuned at the factory" remains a valid claim even after the inevitable shocks and jars of shipment. This exceptional Gonset packaging entails no extra cost to you, is absorbed in a selling price that would still offer full and excellent value if the assemblies were merely wrapped in paper! Just one of the many reasons why you should make your choice a "BANTAM".

Features

Performance in all kinds of weather

approaching that of a full-length 20 meter array.

EXTREMELY COMPACT . . ONLY 16½ FEET, TIP-TO-TIP . . . . . .

LIGHT IN WEIGHT . . . ONLY 27 POUNDS

EASILY ROTATED BY TV-TYPE ROTATOR

EXCELLENT FRONT-TO-BACK RATIO . . . .

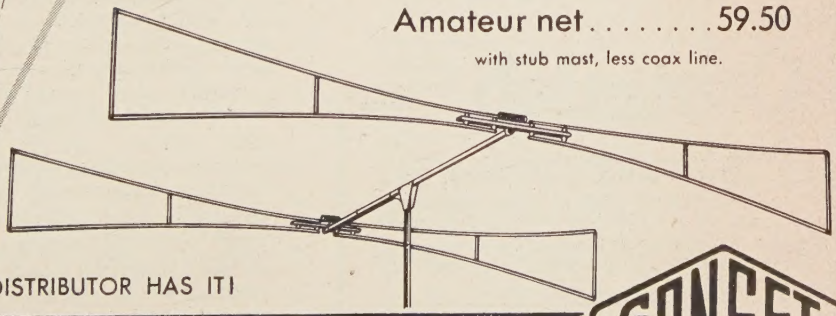
LOW STANDING WAVE RATIO . . . . . .

SINGLE COAX FEED . . . FULLY BALANCED SYMMETRICAL . . . . . .

FACTORY TUNED...NO SUBSEQUENT COIL OR LENGTH ADJUSTMENTS NECESSARY .

Amateur net 59.50

with stub mast, less coax line.



YOUR GONSET DISTRIBUTOR HAS IT!

GONSET CO.

801 SOUTH MAIN STREET, BURBANK, CALIF.

GONSET

trains being announced. Ninety percent cop are passing.

For sending, are neerly same thing, only thi time amchoor yelling out message to you Sounding easy, but not when amchoor holdin icey cube in mouth. You can seeing this ar harder, so we making it passing mark if yo understanding half of message. After alls, h can always repeeting it twice when ackshewall working Dee-X. No heering aydes can be use in this test, just to keeping it fare.

For see-w man test, having to getting speshu room. First are getting about ten rusty hinges and cupple code practise oscillators. Now, get ting four fellers to using code practise oscil lators, each one keying away like sixty. Als having ten other gentlepeeples moving rust hinges back and forth. Now, while all this ar going on, you using a third code oscillator an sending see-w to amchoor taking test. He mus reseeving 20 words per minute while wearin earmuffs. Of course it are no fare to ritin down the message—he must memorizing it.

Sending test are reel easy. Just fixing up cod oscillator so only you can heering it, the taking bug and removing all waytes. Amchoo passing test if he sending 20 words per minut with left foot (having to keeping shoe on fo this test).

Well, there it is. Compleet rules for WACOP Some award, you not thinking? You can send ing out big certificate saying amchoor ar capable of working all countries. Boy oh boys not too many amchoors getting this award Having to have big rig, reel neet antenna, re hots reseever, and being 1/c operator.

You knowing, the more I thinking about this if any amchoor can passing this test, he mit as well just go ahead and work the Dee-X any way. Excoose me while I going downtown an buying cupple more toobs for final.

Respectively yours,
Hashafisti Scratchi

FCC Proposes CONELRAD Rules for Amateurs

On August 31, 1955, the FCC initiated rule making to incorporate in Part 12 of its Rules Governing Amateur Radio Service that part of the CONELRAD plan which pertains to the conduct of amateur radio stations during an alert.

As announced June 2, 1954, all amateur stations, except stations in the RACES and stations specifically authorized otherwise, would cease operation immediately upon receipt of the radio alert from broadcast stations. Stations in the RACES and such others as are specifically authorized to operate during the alert would conduct operation under certain restrictions.

Comments may be filed by individual amateurs or by groups by Oct. 3.

.....about this ALL NEW receiver GPR 90

Complete receiver - Amateur Net $395.00
Matching Speaker $16.00 extra

Our Engineering Department has been developing the GPR-90 for over two years and during that time many prototypes were produced. Our objective was to produce a good receiver, rugged enough to last a long time, sell at a reasonable price and maintain a high resale value.

Noise • Many people judge a receiver by the amount of noise it makes when it is turned on. We think the idea is to hear signals, not noise and with this in mind, we reduced the noise to a minimum, so that for one microvolt of sensitivity, the receiver has a 10 db signal to noise ratio. In simple terms this means that the signal plus the noise, is 10 db above noise alone. So when you turn the receiver on and it appears to be too quiet, remember, it is still very sensitive.

Intermodulation • We use a modified grounded grid front end in this receiver, about which there may be some concern with regard to intermodulation (sum and difference spurious carriers.) The front end of the GPR-90 was specially designed to employ a TMC ferrite input transformer, a product designed and produced exclusively by us. The grounded grid stage, used on bands 3, 4, 5, and 6 (where it does the most good), is preceded by a high pass filter which virtually eliminates intermodulation caused by strong broadcast carriers—for example, a 5.88 mc. spurious carrier produced by a 55,000 mv signal at 880 kc. and a 55,000 mv signal at 5000 kc. will be down 92 db. Moreover, the grounded-grid stage always has either AVC applied or is on the RF gain line.

Calibration • Dial Calibration with high degree of accuracy is not easy to attain in a general coverage receiver, but it can be done. It is much simpler to provide highly accurate calibration and tracking over the amateur bands only, but this "specializes" the receiver. The GPR-90 is calibrated to communication accuracy, over its entire six bands. In our case the primary factors in calibration were oscillator drift and condenser curves. We believe that we have adequately taken care of these items and produced a well calibrated receiver.

Audio Selectivity • We think you will like our exclusive audio selectivity and audio spread features. They are usable on CW, phone, and SSB. In the sharp position the peak of the audio curve (exalted 6 db) is approximately 50 cycles wide, and a CW signal peaked at 1200 cycles will actually seem to leap out of the noise, when properly peaked by the B . F. O.

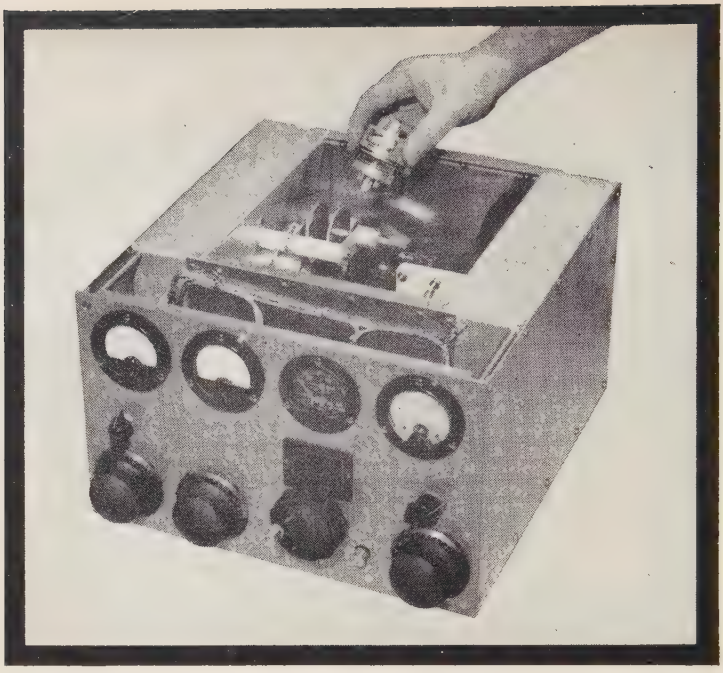
S. S. B. • The GPR-90 will receive SSB signals as well as any communications receiver not specifically intended for SSB. It has adequate stability, rf and audio selectivity, generous B.F.O. injection, which can be raised if desired and the AVC can be used with B.F.O. on. However, we do not feel that the average ham is rushing madly to all-out SSB operation—at least not right away. SSB is a very efficient form of communication but is slightly complicated for the average ham. However, an ideal combination for SSB is the GPR plus a signal slicer and the GPR-90 provides for such insertion of a "signal slicer" between the 455 kc I.F. and the audio output, on the rear deck. TMC will produce such a slicer in the near future in a matching cabinet.

XTAL Calibrator • when the question of a crystal calibrator was raised, it was decided that it came in the category of an acessory and would raise the cost unnecessarily. For those who wish, a kit will be available for simple installation either at home or the factory.

The success of any product is its acceptance by the user. Advertising claims will sell the product but only the product can keep itself sold. If you like the GPR-90 it will be around a long, long time.

Bulletin 179 for complete details.

(Advertisement)



A PAIR OF EIMAC 4X250B's—
the easy, modern approach to a compact one-kilowatt CW and SSB rig

You'd be amazed how easy it is to build a one-kilowatt rig using Eimac 4X250B radial-beam power tetrodes. Each of these bantam tubes handles 500 watts input with only 2000 volts on the plate. A pair in the final amplifier provides a kilowatt with the power supply and transmitter combined taking only a fraction of the space required for an old-fashioned kilowatt rack.

The straight forward modern approach afforded by 4X250B's allows simple circuit design. Driving power is so low that annoying TVI-producing harmonics generated in the driver stages are minimized. Low feedback capacitance makes stabilization of the amplifier stage easy.

The versatile 4X250B can supplant the famous 4X150A, and it offers the advantages of easier cooling and higher power. No forced-air cooling is required during stand-by periods if convection air is provided properly.

For further information on the new 4X250B, contact our Amateur Service Bureau or visit your Eimac distributor.

TYPICAL OPERATION

4X250B Radial-Beam Power Tetrode

(Frequencies to 175mc per tube)

	Class-C CW or FM Phone	Class AB_1 RF Linear
D-C Plate Voltage	2000v	2000v
D-C Screen Voltage	250v	350v
D-C Grid Voltage	—90v	—50v
D-C Plate Current	250ma	250ma*
Zero Sig D-C Plate Current	— —	100ma
D-C Screen Current	25ma	15ma*
Peak RF Grid Voltage	115v	50v*
Driving Power	2.8w	0w
Plate Power Input	500w	500w*
Plate Power Output	410w	325w*

*Max Signal

An Eimac air system socket with built-in screen by-pass condenser provides optimum amplifier circuit stability and cooling arrangements for the 4X250B.

Eimac

EITEL-McCULLOUGH, INC.

SAN BRUNO • CALIFORNIA

. . . de W2NSD

NEVER SAY DIE

WOW! It sure is a pleasure to put out a good big issue of *CQ* when the response is so immediate and positive. Letters and cards of congratulations poured in from all over the world, and so far not one gripe. It doesn't seem possible for I know darned well that there is no way to please everyone—it can't be done. My heartfelt thanks to all of you who took the time to write. My thanks too to all of you that helped us by talking about *CQ* over the air.

To prove that the September issue was no one-shot splurge here is the October issue which is even thicker and every bit as full of information and interesting articles. A couple of my past editorials have pointed up our need for manuscripts and, as you can readily see, these have been forthcoming and are certainly welcome.

Yasme

One very pleasant surprise came to me on the Yasme DXpedition when the first story from Danny arrived. Dick Spenceley, KV4AA, our DX Editor, is largely responsible for promoting the ham radio end of Danny's trip and he spent about three months and some hard cash getting equipment, spares, supplies, etc., rounded up and installed on the 40-foot yacht. Dick has been after everyone to help Danny out and his quest has been fruitful, for *Elmac* donated an *AF67* transmitter, *Westinghouse* a gas generator plus cordial welcomes at *Westinghouse* offices all over the world, and *CQ* sent down an *Elmac* receiver and some other things. DX groups have been pitching in to help Danny out too. You can read about this in the DX Column and in special articles by Danny which will appear from time to time. The surprise to me was that Danny's first report was really terrific. Before it turned up I had no notion that we would get much more than a bare log of what was going on. You know, "Left so-and-so on such-and-such a date, arrived . . . etc." . . . which might be followed by a list of calls worked, ugh. Instead you will find this first part of the trip quite exciting and interesting. You are right there with him on the Yasme.

DX Contest

Quite a few of the pages of this issue will be taken in giving the results of last year's World-Wide DX Contest. The ARRL DX Contest gives the American and Canadian hams a terrific advantage over the rest of the world since everyone has to work us and not each other. The *CQ* World-Wide DX Contest puts everyone on an equal basis and probably for this reason has come to be by far the most popular DX contest in the world. Give it a try this month and you will see that there are many countries active during this period that rarely are heard.

VHF Contest

Another contest which you may not have noticed is brewing in the VHF Column and is arousing quite a bit of interest. It is cleverly designed to equalize as much as possible the advantage that some VHFers have in using high power or good locations. As Sam said when he worked out the contest, "I tried to devise one I couldn't win." That takes a bit of doing, too, since Sam has hit the east coast like an atom bomb on two meters with his kilowatt and high 64 element beam antenna. He works into Chicago from Boston on two meters about the same as I work from Brooklyn into Queens, a few miles away.

Future Articles

All is not contests though and a quick peek into the manuscript file shows that we have some fine articles scheduled for the coming issues. There has been considerable emotion for and against commercially built equipment. Some cry out for the goodeoldedayes when people built their gear, some wonder why all the bother when you can get a good rig for a few thousand dollars. I've built some, I've bought some, I've converted surplus . . . I don't care whether you build your own rig or not, but I do think that you are missing a big piece of the fun of our hobby if you don't build a lot of your own equipment. Sure, operating is fun, but that is only a small part of the fun that you can get out of ham radio. Building is fun, scouting around for the parts for a rig is fun, ham clubs are fun, and DXpeditions are fun, even if they are only to a local high point for some VHF work. There are so many facets to ham radio that the six regular columns in *CQ* represent only a small part of such activities.

Experimenters, Unite!

One major activity of ham radio that is going strong, despite an almost utter lack of communication between those mutually interested, is *experimenting*. Theoretically (according to

the FCC regulations) this is one of the primary functions of the amateur. What would you say to a column in *CQ* devoted to the amateur experimenter? When I use the term experimenter I am not referring to the Electronic Flowerpot school of tinkering, but to such things as amateur TV, facsimile, and the swapping of technical notes and data on all sorts of things which are not yet proven or accepted. Such a medium of communication for interested hams would greatly improve our value to the country by encouraging more of us to try out new ideas and see what we can do to solve particular problems. Remember that the bulk of the startling discoveries came from amateurs and not professionals in almost every field. The professional cannot afford to spend his time on a vague gamble that an idea may work or may not . . . . he has to know that there is a good chance of success before he can start. If you want an Experimenter column in *CQ* let me know.

The Diane Emergency

Whenever there is an emergency which upsets the regular means of communications you can be assured that temporary communications will be set up by amateur radio within a few hours. This is so common a thing now that no one marvels at the job that is done in each of these disaster areas. From the viewpoint of the fellows involved there is nothing usual though, so let's take a quick look at the latest demonstration that amateur radio has put on for the country.

Full details, pictures, lists of calls involved, etc., can be found in QST so we will stick pretty much to the high points.

As you probably remember the disaster started Friday morning, August 19, when with practically no warning flash floods struck several communities in the Delaware Water Gap area, and later in parts of Connecticut and southern Massachusetts. Radiowise the disasters were split into two sections, the Pennsylvania-New Jersey-New York area and the Massachusetts-Connecticut area. Two emergency channels were established for the Pennsylvania area at 3845-3855 kc and 3905-3920 kc. The Connecticut channel was 3865-3875 kc.

Apparently the ham radio activities really got into gear on Sunday morning and most of them were in action right through to Wednesday and Thursday when the emergency was ended. W3NNT and W3ZOM of Bethlehem were taken to Milford (Pa.), complete with their equipment, by helicopter, and a link was set up with W3PYF of Easton who in turn relayed via 10 meters directly to the Bethlehem Red Cross Headquarters manned by W3QBF. Mobiles W3ELH, W3QMW, W3VSB, W3LCL, and W3ZBF were sent in later as things began to open up. Uncle Dave, W2APF, came down from Albany with his mobile rig and set up the only communication link for Newfoundland, Pa. An interesting sidelight was the grindin of crystals for the Milford gang by W2IBH i Uniontown, New Jersey and the sending o them up by State Police courier to Milford. I Stroudsburg, Pa. our honor was wonderfull upheld by W3MAA, W3UCY and W3YAZ.

Naturally almost everyone in the disaste areas had relatives in New York City wh wanted to be reassured that everything was al right. The burden of this fell on W2KFV an his XYL W2KEB who handled all of the officia Red Cross traffic into all emergency areas. Be tween 300 and 500 inquiries were handle through this station.

The New England Emergency Net wit W1SS as Net Control started Sunday morning During the action 162 different stations calle in either to send or receive emergency and wel fare messages. Special mention goes to W1GIX who worked around the clock and piled u more than 150 hours on the air during the emergency.

Throughout the flood-stricken area and in the outlying areas anxiously waiting news o loved ones, gratitude for the Amateurs' effor was immediate and heart-warming. Radio and TV stations in the East and in many other parts of the country were unreserved in their praise for the job the Amateurs were doing. On the bands, messages were handled efficiently with a minimum of waste speech. Relays ran quickly and smoothly, with many high power fixed stations standing quietly by ready to lend a few db when needed. Possibly the number of lives saved by the presence of the Amateur links could be roughly estimated. The consolation of loved ones and all the advantages of *being able to communicate* could not.

Article Wanted

OK all you inventors, here is a specific thing that I would like to publish in *CQ*, but haven't gotten any manuscripts on as yet: the conversion of a Heathkit amplifier (preferably the 20 watt job) to a modulator. As I see it, most of us want a pretty good hi-fi amplifier around the shack for FM or records and there is no reason why this can't double as a modulator if we hook in some sort of function switch on the amplifier to change the output from a speaker to the modulation transformer and narrow down the bandwidth a bit to communication standards. Any takers? We have $50 waiting here for the best conversion manuscript that shows up by December first.

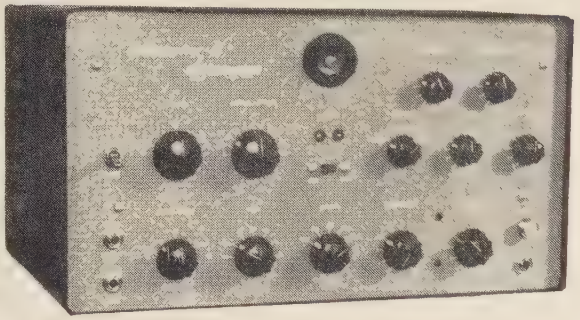
Information Wanted

We are in the process of preparing some articles and releases for newspapers and other magazines so that amateur radio will be better understood and appreciated by the general public. If you have any information on the following it sure would help if you would send

[*Continued on page 106*]

here's the ULTIMATE for ALL amateur communications

AM—PM—CW and SSB . . . the "Phasemaster-II"



phasing type exciter—AM—PM—CW and SSB with switchable sidebands at the flip of a switch—75 W PEP output—completely bandswitched 160 thru 10 meters—wide range pi-network output—fast operating built in anti trap voice control circuit—rounded corner black crackle cabinet with gray front panel, black knobs and white screening—separate phone patch and mike inputs—accessory power socket for accessory equipment—COMPLETE internal shielding including solid shielding for final tank assembly to give stable operation—no critical external carrier balancing controls—new carrier insertion control—new variable calibrating control for zero-beating frequency—new eye circuit for precision operation—40 DB or better unwanted sideband suppression—no mixer stage tuning ELIMINATES OUT OF BAND OPERATION—2 additional sets of relay contacts on rear chassis—wired and tested with all tubes or in kit form—a complete wired, tested and ALIGNED audio thru balanced modulator subassembly is furnished with the kit this allows the balance of transmitter to be built as simply as a CW rig-all operating controls on front panel Audio Gain, Carrier Level, Emmission, Bandswitch, Buffer Tuning, P A Tuning, Antenna Loading, VFO—CRYSTAL, Function, VC Gain, AT Gain, Indicator Level, Calibrate Level and Eye Indicator.

$329.50 Wired and tested
$279.50 Kit form

TIME MASTER

115 V AC continuous gong timer—pleasant gong strikes automatically every 10 minutes—can be reset to start at any time — dial indicates 10 min time duration—compact molded black case ($2\frac{3}{4}$" x $4\frac{1}{8}$" x $2\frac{5}{8}$") with lithographed front face—meets FCC regs 12.82 (a) (1) (iii) & (iv) for 10 min identification requirement — complete with off-on switch and cord—DON'T GET A PINK TICKET

$7.95

Write for special electronic, electrical or mechanical timer requirements

TONE MASTER

SELF powered, transistorized audio SINE WAVE generator — approx 1200 cycle tone freq—variable from 0 to over .5 volts RMS output with calibrated dial—connects directly to HiZ mike input to provide two tone test for SSB or for checking AM modulation and speech equipment—ideal for audio enthusiasts —portable, can be hand held—A MUST for every shack or service man—no need to buy expensive bulky audio generators —housed in compact black molded case ($2\frac{3}{4}$" x $4\frac{1}{8}$" x $2\frac{5}{8}$") with lithographed front face

$12.95

Lakeshore INDUSTRIES

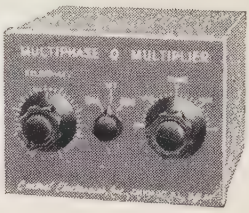
408 COMMERCIAL STREET MANITOWOC, WISCONSIN

MANUFACTURERS OF PRECISION ELECTRONIC EQUIPMENT

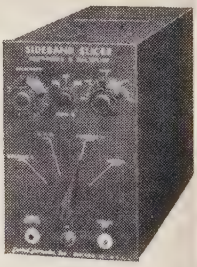
NEW MULTIPHASE "Q" MULTIPLIER

- Peaks Desired Fone or CW Signal
- Nulls Out Interfering Carrier up to 50 DB. No Loss in Speech Intelligibility
- No Insertion Loss — New Two Tube Circuit
- Special High "Q" Pot Core Inductor

MODEL AQ



MODEL DQ



MODEL B SLICER

CONVERTS MODEL A SLICER

Plugs into Model A accessory socket, converting it into a Model B. New front panel and controls provided. Enjoy all the advantages of "Q" Multiplier selectivity on CW, AM & SSB with your present Model A Slicer.

Wired $29.50
Kit $22.50

FOR AM, CW, SSB OPS

Desk Model "Q" Multiplier for use with any receiver having 450 to 500 KC IF. In attractive, compact case with connecting power-IF cable. Power supplied by receiver. Also provides added selectivity and BFO for mobile SSB or CW reception.

Wired $29.50
Kit $22.50

BUILT-IN "Q" MULTIPLIER

Upper or lower sideband reception of SSB, AM, PM & CW. For use with any receiver having 450-500 KC IF.

Wired $99.50
Kit $69.50

MODEL A SLICER

Same as Model B but less "Q" Multiplier

Wired $74.50
Kit $49.50

A NEW CONCEPT IN LINEARS

MULTIPHASE 600L

BROAD BAND LINEAR AMPLIFIER

NO TUNING CONTROLS!

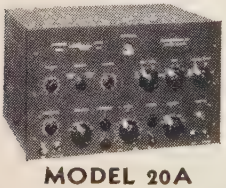
SINGLE KNOB BANDSWITCHING 10-160 METERS

- Single 813 in Class AB_2. Approx. 2 watts effective or 4 watts peak drive for 500 watts DC input.
- New band-pass couplers provide high linear efficiency: 60-65%.
- Designed for 50-70 ohm coaxial input and output.
- Built-in power supply. Bias and screen regulation. Automatic relay protection.
- Exclusive metering circuit reads grid current, watts input, RF output, reflected power from mismatched load — switch to any position while on the air!
- Completely shielded — TVI suppressed. Free of parasitics! Low intermodulation distortion.
- Choice of grey table model (17⅝"W, 8¾"H, 13"D) or grey or black rack model.

Wired, with tubes $349.50

MULTIPHASE EXCITERS

Check These Features



MODEL 20A

- **20 Watts P.E.P. Output SSB, AM, PM and CW**
- **Bandswitched 160 — 10 Meters**
- **Magic Eye Carrier Null and Peak Modulation Indicator**

Choice of grey table model, grey or black wrinkle finish rack model.

Wired and tested $249.50
Complete kit $199.50

NOW IN BOTH MODELS

- Perfected Voice-Controlled Break-in on SSB, AM, PM.
- Upper or Lower Sideband at the flip of a switch, with 40 DB. suppression.
- New Carrier Level Control. Insert any amount of carrier without disturbing carrier suppression adjustments.
- Talk yourself on frequency.
- Calibrate signal level adjustable from zero to full output.
- New AF Input Jack. For oscillator or phone patch.
- CW Break-in Operation.
- Accessory Power Socket.

MODEL 10B

- **10 Watts P.E.P. Output SSB, AM, PM and CW.**
- **Multiband Operation using plug-in coils.**

Choice of grey table model, grey or black wrinkle finish rack model. With coils for one band.

Wired and tested $179.50
Complete kit $129.50

MULTIPHASE EQUIPMENT

Central Electronics, Inc.

1247 W. Belmont Ave. Chicago 13, Illinois

WRITE FOR LITERATURE ON THE COMPLETE MULTIPHASE LINE

High Power Three-Phase Mobile Power Supply

Malcolm Stevens, W8IWG
1541 Belvidere, Detroit 14, Mich.

The mobile systems we are familiar with are limited to a maximum of about 100 watts input. The limitation is that poor overworked and abused accumulator (storage battery to you) which, even without the ham radio drain upon it, is frequently found to be of insufficient capacity to cope with the heavy electrical loads of modern automobiles.

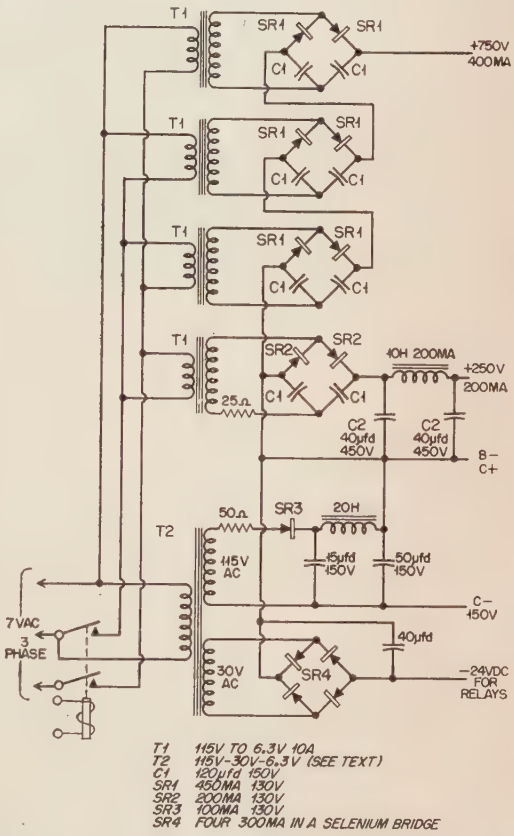
To operate high-power transmitters a mobile operator might resort to one of the following:—
(1) Install a very large "marine-type," industrial storage battery or a collection of common car-sized batteries in series or parallel with provision for garage-charging overnight.
(2) Provide a gas engine putt-putt driven high voltage generator or alternator delivering 110 volts a.c.
(3) Employ a high-output alternator-low voltage rectifier combination, such as the Leece-Neville arrangement to charge the battery at extremely high current rates during periods of high drain. Other arrangements are possible, usually variations or combinations of the above.

It seemed to the author that a better approach might be to make direct use of the output from the Leece-Neville alternator instead of rectifying it and charging the battery first. An attempt was made to step the voltage up to 115, by means of a transformer, and then use this voltage to operate standard 60-cycle equipment. This actually worked but the performance was nothing to brag about. Most of the difficulty could be traced to the use of cascaded transformers which performed poorly with the variable frequency generated.

The idea that finally did the trick involved the use of three separate 6.3-volt filament transformers, operated in reverse from the 3-phase output of the alternator, to deliver 3-phase 115-volt output from what were originally intended to be the primaries of the transformers.

This 3-phase output is passed through a group of full-wave selenium voltage doublers with dc output of the three full-wave systems connected in series. About 300 watts is developed in this arrangement in the setup built by

[*Continued on page 70*]



Inexpensive reverse-connected filament transformers plus selenium rectifiers provide an economical power supply when used with a Leece-Neville type alternator.

The 40-foot Bermudian Sloop Yasme, on the first leg of VP2VB's one-man round-the-world DXpedition.

Aboard Yasme.....
St. Thomas to Panama

Scheduled to leave at noon, 1st August 1955 from KV4-land, everything worked out fine, barring the fact that there was very little wind; however, Dick, complete with XYL and junior, coupled with a few other interested types, were there to see me depart.

As the 12 o'clock siren went, I just managed to get anchor on deck, then up with the sails, one complete circle to give the photographers a chance, then on my way.

The wind, what there was of it, gave a few very disheartened puffs, and decided that it wasn't worth it anyway, and finally left me with a flat calm, an oily sea, a very sticky heat and a 35-degree roll on the boat which threatened to throw me overboard at the first opportunity. Forced to have the engine running, the temperature rose to over 100, and the heat even set the jars of jam bubbling in the galley drawers.

I was feeling thoroughly browned off having spent a pleasant 3 months ashore with Dick

and his family, and this business of sailing around the world single handed in a small sail boat had lost its appeal completely, and, feeling very sorry for myself, I just sat in the cockpit and gazed at the slatting sails, hoping that the boat would sink.

Well, to get on with the story, Dick and I had arranged skeds so that we could pass all the news to each other. Also he would have some idea where I had sunk should I decide to have an argument with another ship, or should perhaps a gale win an argument with me, but apart from all this, these little QSO's did help considerably to kill the solitude, and for the first 400 miles I also had many QSO's with the "Net" gang around the West Indies on 80 meters.

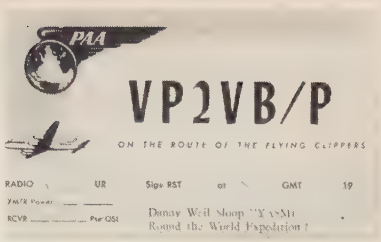
Two days out and only 150 miles covered; I nearly went nuts, and to top it all off, our friend "Connie" was announced over the rig and her position, speed, etc. given. This little incident gave me food for thought, and I went into the heaving cabin to plot as carefully as I could her position on the chart, wondering what the heck was going to happen next.

After a little figuring, I reckoned that at the rate I was moving she would certainly catch me a "fourpenny" one, and I hadn't got my umbrella with me either; anyway, I did the next best thing, cursed the engine, the weather, the boat, and anything else I could think of, and then got out the heavy weather sails and hanked them on in readiness for the blow.

Time whizzing by and still no wind, the glass falling fast, and the engine has developed hiccups in three of its four cylinders . . . water in the tank: OK, switch to the other tank; a darn good idea, but the pipe line blocked and the engine ran for another 5 minutes before giving up altogether, so that put the top hat on that idea. Ah! Another brain wave, get a can of gas and siphon the gas direct to the carbureter via a rubber pipe. After swallowing a couple of pints of gas, finally got the engine going again, but it soon stopped after 15 minutes jerky running. Discovered that the pipe had melted with the heat, and somehow the engine wouldn't run on a mixture of gas and small particles of rubber.

Feeling like nothing on earth, and dripping with perspiration, I stuck my head out into the open air for a breather and, lo and behold, a breeze was coming up out of the east. I dropped the wrench . . . on my toe of course, tore out of the cabin along the deck removing one toenail on a cleat on the deck . . . the same toe of course, and hoisted every bit of canvas I had aboard. The breeze increased, and before long, we were bowling along at a steady five knots, just at the opportune moment.

Needless to say, I felt greatly relieved, and after fixing the tiller so she sailed herself, I grabbed myself a cup of coffee, and then got cracking on the job of clearing the choked pipeline, cleaning the carbureter, and straining



the gas in the other tank. This little bit of business took 7 hours . . . you try stripping a carbureter etc., etc., in a space around 3 square feet, and a red hot exhaust pipe in close proximity. The jobs got fixed OK, but I have still got a few burns, one in a very awkward place too, which kept me standing for some time afterwards . . . more comfortable than sitting.

The wind held in my favor for two days, then fizzled right out, leaving us rolling all over the place in a really nasty sea. On with the engine again and hope for the best, and every four hours, reports coming in that "Connie" is still chasing me. Pity she didn't wear skirts, I wouldn't have been in such a hurry.

Food . . . (that eating habit I picked up as a kid) became increasingly more difficult to prepare. One needed to be a contortionist plus an acrobat to cook anything. I did on one occasion try to make some pancakes, but gave it up as a bad job after removing them from the floor under the primus stove several times; they never taste as good mixed with kerosene and lube oil, dunno why. Anyway, I had plenty of tea, coffee and biscuits, so they filled the hole for the time being.

I did on one occasion decide to open a tin of sausages that I'd bought in Africa. . . . I must have been an optimist. Directly I pierced the can, there was a minor explosion. The lid blew off, and very defunct "snorkers" were sprayed with the force of a hand grenade over the galley, the charts and me. I feel sure that a skunk could not have competed with that can of sausages, and for the next few days it took great will power, plus a handkerchief over my nose, to enter the cabin to work the rig.

Shortly after the sausage episode, good news came over the air that Connie had changed course: could it be the aroma from our "snorkers"? I doubt it, but at least I felt that I was then reasonably safe, and breathed a little easier. Just then I had covered about 500 miles, and Dick and I were working CW on 20 meters. Prior to that, we had worked 40 and 80, but QRN had been really grim, so it was a great day when the skip was in our favor.

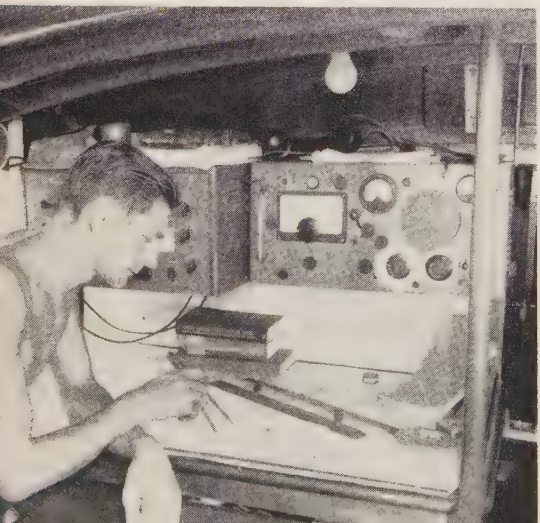
Still no wind, and nine of the horses of my ten horsepower engine had given up the ghost, and we were plodding along at a steady 1½ knots. Now and again I did get a slight puff of wind, but always heading me, so that wasn't much help. Also the gas was getting low, so

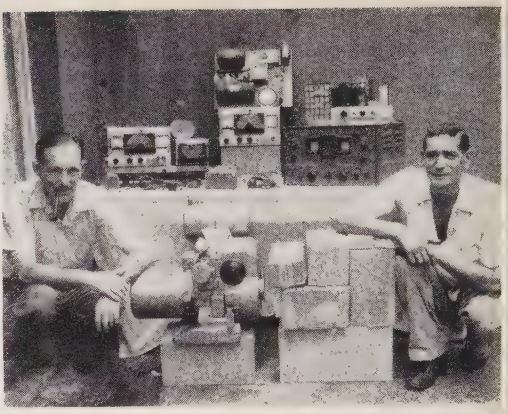
I had to give up using the rig so often.

Working the rig on this trip was quite an experience, and for those that were unfortunate in having a QSO with me, I must apologize for my bad CW. To fire up the rig was an easy matter, but to operate the key was another proposition altogether. Try to imagine yourself in a very small cabin which lurches from side to side at odd moments and at angles of 35 degrees. Seat yourself on a very unsteady stool, then try to work CW with an occasional dive into the cockpit to put the boat on course. These conditions are a slight underestimation, but I think you will understand when I tell you that there were many times when I signed off seated on the floor of the cabin, with the phone cord around my neck. But apart from these little inconveniences I managed to make around 150 QSO's on the trip.

The day before arrival into Cristobal at noon was a sticky time for the whole crew aboard Yasme. A westerly current had made navigation more than usually difficult, and it was essential that a definite fix be made that day. Ten minutes before noon I am sitting on the cabin roof with the sextant ready to shoot the sun, waiting very patiently for it to reach its zenith. Five minutes to go and I see a dirty black cloud coming from the west. . . . Three minutes to go, and it's getting closer; can I get that sight before the squall hits me? . . . I doubt it . . . so, one mad rush to the cockpit to stow the sextant; that MUST NOT get damaged, then another rush to the headsails to get them down: halyards to loosen, sails to haul in before they go over the side, then lash them to the rails.

I had just got the sails tied down when the squall hit me. Yasme, practically stationary at the time, heeled to an angle of 45 degrees, the rail went under, and with deck awash, spray flying everywhere, and under bare poles, she took the bit in her teeth and hared away at over 8 knots down wind. A few seconds later, I heard a terrific crack and thought something had busted, but it was only the canvas cockpit awning that had ripped loose from its moorings, and the last I saw of it, it was on its way back to St. Thomas. For thirty minutes we went like the clappers of hell, the rain came down solid, and the seas were flattened with the force of the wind. Then, as though someone had moved a switch, it suddenly became calm, and there we were again, blown back in the wrong direction around five miles with no wind, and with this infernal roll.





CQ's DX Editor Dick Spenceley, KV4AA, radio gear, and Danny, VP2VB, respectively, before installation of the gear aboard the Yasme.

Well, regardless of the lost noon sight, and the awning, somehow we managed to hit Cristobal on the nose, and with the engine plugging away on one cylinder, and the gas almost gone, we dropped the hook in the harbor at 10:30 a.m., 13th August, after one of the worst trips I have ever made since leaving England.

Tired out and very hungry, I made my peace with the powers that be, and was greeted by three Hams, KZ5EM, KZ5MN, and KZ5LB, who then whipped me off in a car to Balboa, filled me solid with the finest food I'd tasted for some time, then gave me a bunk . . . pardon me, a bed to sleep. . . .

Do you know fellers, I was dead beat, and fit to drop, but to sleep in a real bed that didn't move was impossible, so I got our three friends to jostle the bed all night so that I could slumber in comfort . . . you don't have to believe this last part!!!! But anyway, I did get a good nap, and that was all that mattered.

The following day I was taken back to Cristobal, to prepare for the Panama Canal Transit. This was something I had looked forward to for some time, yet I had heard so many reports from small boat owners of the risks incurred that in the back of my mind I felt a little scared. However, the authorities arranged that I be ready to shove off at 6:45 a.m. with the engine running . . . they didn't know my engine, or perhaps they were optimists, but at 0645 a.m. on the dot, the pilot

was there with KZ5MN and junior to assist, and the engine actually fired on all four cylinders.

Five minutes later we were off on the next part of the trip. The first set of locks appeared at 0710 on sked, and, accompanied by a larger British yacht, we tucked ourselves in behind a large cargo boat. By arrangement with the other yacht, I tied up alongside him, and he took up his position against the wall with many rubber tires alongside to protect him from the walls of the lock. When all was secure to the pilot's satisfaction, the lock gates closed on us, and there we were in this massive deep cavern, with walls towering over 40′ above us.

We waited a few seconds, then the water started to rush into the chamber. Never in my life have I experienced that feeling inside of me that came in those next seven minutes. How can I, a very "Ham" writer, possibly explain my emotions at that time? At first I was mildly interested, then my interest turned to panic as the two yachts were thrown into the center of the lock with the ropes holding us to the side quivering with the terrific strain imposed on them. One of my forward lines, a rope 1½″ in diameter, snapped and the pilot threw another rope to the other yacht just in time to prevent any damage. The next minute, we were thrown like corks against the lock wall, and I really felt that both of us would be crushed and sunk in this fantastic turmoil. The other yacht had the major part of the work to do, inasmuch as they were handling the ropes that were attached to the side of the lock, and as we rose they had to haul them in. When you come to consider that the total weight of the two yachts was around 60 tons, and that four men were trying to prevent them from being thrown into the center of the locks with brute strength alone against this terrific undercurrent, well . . .

To give you a better idea, these locks are 1,000′ long, 110′ wide, and the water rises 27 to 30′ in 7 minutes. So put your imagination to work, and you will realize that it was no picnic for any of us.

Naturally larger ships are controlled and kept in the center of the lock by steel cables from either side which are controlled by small engines on rails known as "mules," but smaller craft are not so fortunate, and have to control their own activities by hand lines.

We experienced this twice more going up, and finally cruised into the Gatun Lake. This part of the trip was most pleasant, as Yasme, her engine now completely defunct, remained tied up alongside the other yacht, and all I had to do was to sight-see. The lake is man made, and of course, fresh water, and it is this lake that supplies the water to control the locks, everything being done by gravity. There were still trees sticking out above the surface of the water, even though the original forest land in the valley had been covered by water for many years, but we steered well clear of them, and kept to the buoyed channel.

Ultimately we hit the down locks, and this was far more comfortable as the water did not throw us about as much, and to handle the shore lines was a far simpler matter. Three of these locks, with nothing exceptional happening, and then ahead of us the Pacific Ocean. We cruised steadily for a while, and finally tied up to moorings supplied to us by the Balboa Yacht Club, who sent out their launch to give us all assistance possible.

We were all very thankful to be tied up after our hectic journey. I do believe that most small boat owners, whilst wanting to transit the canal, after having done it never wish to do it again, and I must say emphatically that I am one of them. I'd rather cross the Atlantic twenty times than have that experience again.

To complete this little episode, many of the hams in the area have offered their assistance in preparing the Yasme for her next part of the voyage, and, very soon I shall be on my way to all the rare spots. No more Panama Canals, thank goodness. Just a few oceans.

To make my final, please remember lads and lassies, as much as I like to hold long QSO's, I have to consider my gas supplies. Also the longer I hold a QSO, the less chance I have to natter to others, so make 'em short and sweet, and don't think me rude if I suddenly go off the air, I am probably lying on my back on the other side of the cabin, with the phones around my neck . . . one never knows when the old Yasme is going to give a lurch.

Cheerio Old Tops, 73's and all that, and CUAGN.

Danny, VP2VB/MM etc.

The National NC-300

E. C. Harrington W1JE
Haverhill Rd., Topsfield, Mass.

The new *NC-300* receiver has been designed exclusively to provide outstanding performance characteristics in the amateur bands. To achieve these characteristics, certain features prevalent in general coverage receivers are omitted. By concentrating the design on features that the amateur wants, it is possible to provide improvements in frequency stability, sensitivity, and selectivity. Besides these basic improvements, provision has been made for v-h-f converters, a crystal calibrator, external receiver control, and automatic muting. The features that are included in the *NC-300* were determined as a result of a nationwide contest in which many amateurs participated.

Figure 1 is the schematic diagram. The photographs show the layout of the various components.

Stability

The increasing popularity of single-sideband operation and the use of narrow bandwidths for the elimination of interference make it necessary for a successful receiver to have extreme frequency stability. In the *NC-300* stability is achieved through the careful design and use of special high quality components. The elimination of general coverage ranges paves the way to stability not otherwise possible in a wide range receiver anywhere near the price of this receiver. This inherent stability is essential for CW use or for SSB, and is desirable even for AM phone. It is certainly a pleasure to have the station being worked on CW return on exactly the same frequency and ring out the same beat note that was received on his last transmission regardless of the drain on the a-c line while transmitting or the degree of overloading occurring in the receiver. In addition c-w monitoring is much more satisfying than usual. One of the things not often taken into consideration in receiver design is the desire of the Amateur to use his receiver for c-w monitoring. Chirps, drift, and key clicks normally experienced when a receiver is close to the transmitter, especially when using high selectivity do not add to the pleasure of operating. In the *NC-300* special attention has been given to the elimination of this objectionable operating disadvantage found in most other receivers. The combination of all these features made it possible for me to add VS1GU and 4S7GE to my list last weekend.

Single sideband is also improved when received with this degree of stability. Frequent tuning becomes unnecessary and the received station sounds more natural. The use of the linear detector instead of the usual diode is

particularly noticeable when the group in a roundtable consists of strong and weak signals popping on at random. The receiver never blocks on the loudest station even when the r-f gain is adjusted for the weakest station. Even in the "CW" position of the "Mode" switch, the receiver will not block. The use of shunt fed i-f stages with large grid resistors and fast time constants makes receiver blocking virtually impossible.

Noise Figure

For the frequency range covered by the *NC-300* it was found that a satisfactorily low noise figure could be obtained with one of the newer high transconductance pentodes. Triode circuits such as the cascode were found to be unnecessary in the receiver itself although this circuit is used in the companion converters. This results in a low noise figure on the 6, 2, and 1¼ meter bands.

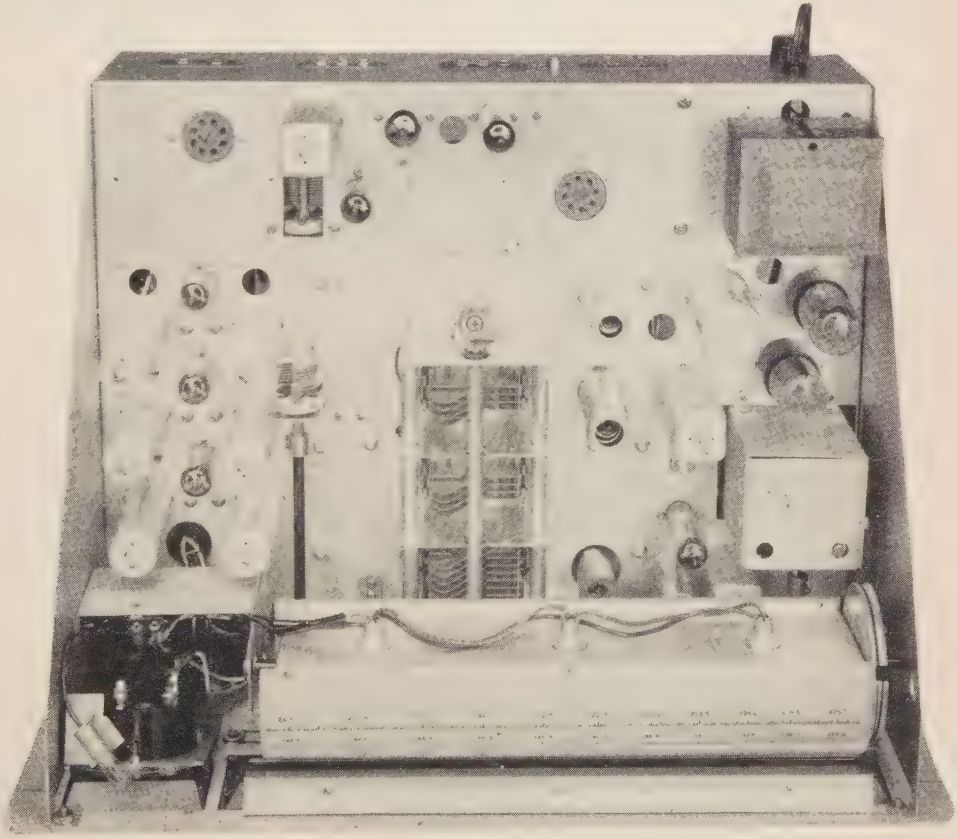
Typical noise figures obtained in the receiver using a type 6BZ6 are 4 db on 20 meters and 5 db on 10 meters. Plenty of r-f gain is available with only one r-f stage. Sensitivity is further enhanced by the use of a switch which allows independent control of the i-f gain with the r-f stage running wide open. This feature provides the r-f gain that is required ahead of the first mixer regardless of the setting of the r-f gain control. Under these conditions, the receiver is susceptible to overload from local signals unless this gain can be controlled. With the *NC-300* the operator chooses for himself and can change the condition at a moment's notice since the control is at his fingertips.

It is common practice in all but the smallest receivers to have about 10 db of reserve gain in the i-f amplifier to deal with aging tubes, etc. This is the gain which must be reduced with r-f gain control when operating either CW or SSB. For AM operation, a.v.c. effectively reduces this gain so adjustment of the panel r-f gain control is unnecessary except perhaps to arrive at more accurate S-meter readings.

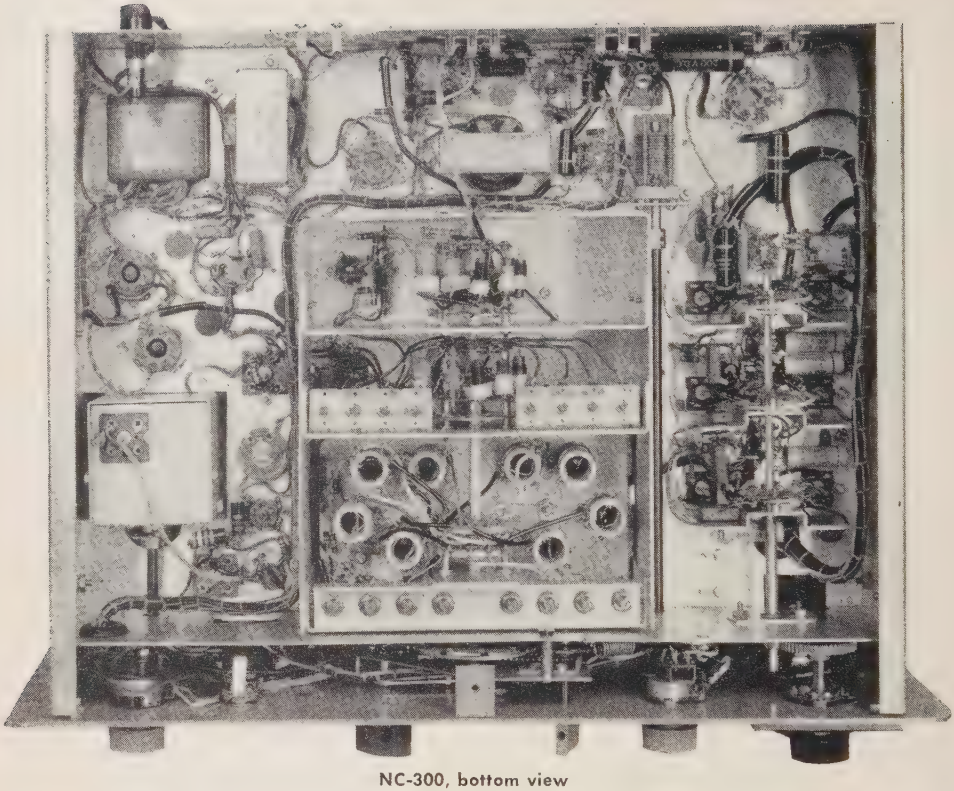
Although I have used almost all of the receivers on the market at one time or another, I have never found anything to compare with the sensitivity of this receiver, regardless of price.

Selectivity

The crystal filter in the *NC-300* is used primarily for phone operation with the i-f switch in the 3.5 kc position. The frequency of the filter is 2.215 Mc and has a broad position which is useful even for Single Sideband work.



NC-300, top view



NC-300, bottom view

For rejection of interference while operating AM, the desired signal carrier is put on the crystal peak as evidenced by maximum S-meter reading and the phasing control is adjusted for maximum rejection of the undesired carrier. With a little practice this procedure becomes easy and the net result is readibility under conditions where normally copy would be impossible. It is much easier if the filter is left in the circuit all the time on bands where QRM is continuous, such as 20 or 75 meters.

In addition to the 3.5 kc bandwidth mentioned above, a 500-cycle position and an 8 kc position are included in the i-f amplifier without requiring additional accessories. It is certainly a gratifying operating experience to use the 500-cycle position for CW. Weak signals ordinarily masked by adjacent strong ones (and of course the strong one isn't the desired one!) can be "arm chair copied." The steep sides of the 3.5 kc position are noticeable while tuning. More splatter is noticed on AM signals than usual because the steep side of the i-f curve will approach the sideband energy before the carrier is received. The two lines on the c-w oscillator control marked "1" and "2" make presetting for Single Sideband use especially easy. Once the c-w oscillator is set to the line, only the main tuning dial is used. If the other sideband is desired, the control is switched to the other line and the receiver is tuned 3.5 kc. With practice the receiver can be set to either sideband in a matter of seconds. The frequencies used for obtaining selectivity are 2.215 kc in the first i.f. (and crystal filter) and 80 kc in the second i.f. This choice results in high ratios of primary and secondary image rejection along with good selectivity.

Converters

The operation of converters in connection with the *NC-300* is made easy for four reasons. The power is derived from the receiver; only the receiver is tuned and it has direct calibration; the i-f amplifier includes an 8 kc wide position; and the velvety smooth 40:1 gear ratio extracts all the work from checking a five megacycle band. The 8 kc wide i.f. position is also ideal for ten meter net operation where it eliminates the retuning necessary for copying stations slightly off frequency.

Audio

While the receiver is rated for only 1.0 watt (undistorted) audio output, it sure makes enough noise to drive anyone out of the room. Plenty of earphone volume is available since it is taken from the secondary of the output transformer. The limiter is very effective when turned just beyond the point where the switch clicks, with little distortion of the received signal.

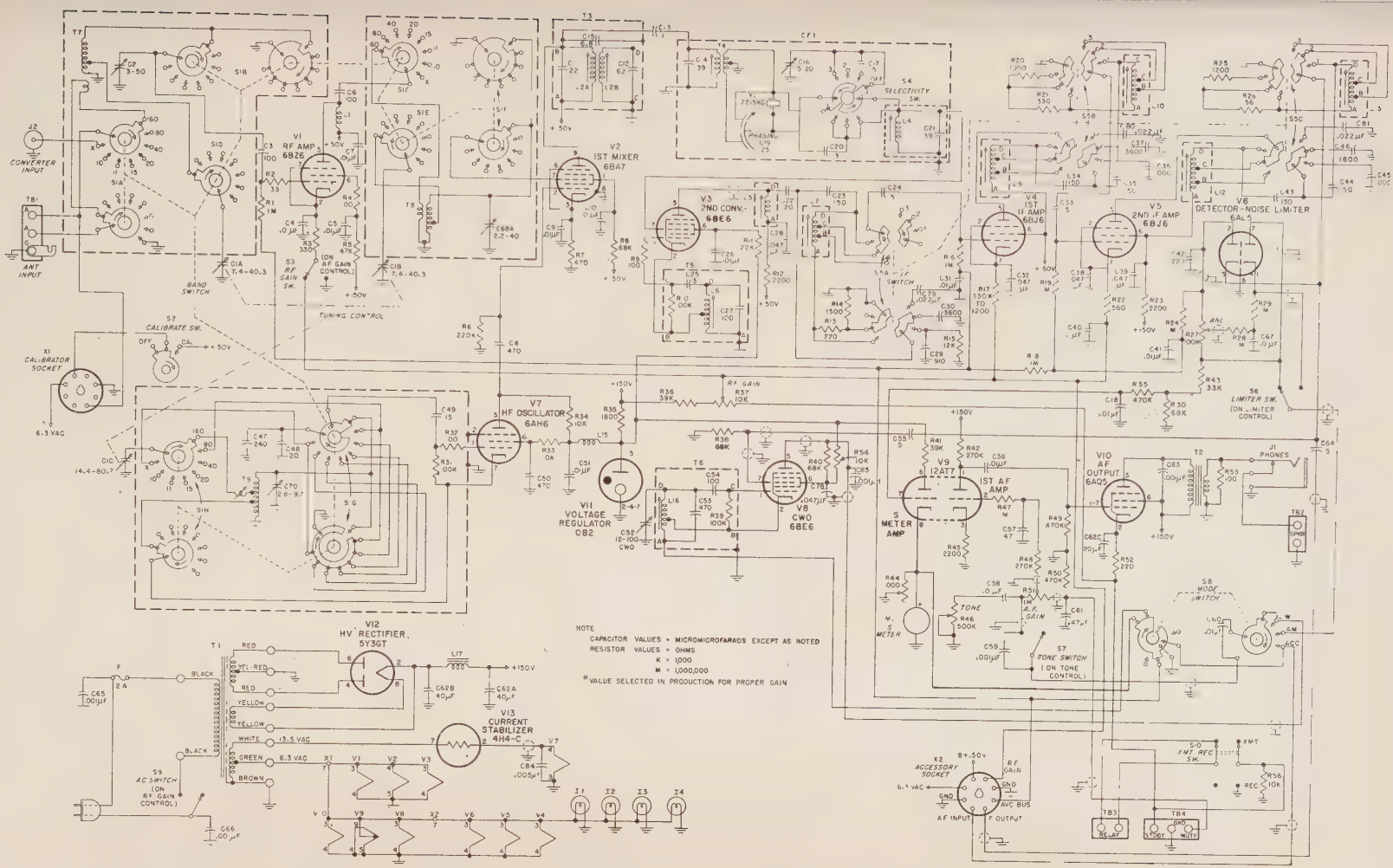


Fig. 1. Complete Schematic of the new National NC-300.

Control Circuits

Several methods of control of the receiver are available. It can be controlled by the use of a muting voltage derived from the transmitter, the front panel switch, or a remote relay or switch. A pair of terminals on the back of the receiver chassis are connected to the unused side of the receiver on/off switch and can be used to remote-control the transmitter from the receiver panel.

Operating Advantages

Contest operating requires the use of break-in or at least a fast means of switching from transmit to receive. If the receiver is used for c-w monitoring, a different level of r-f gain is usually required due to strength of the local transmitter. Constant fumbling with the position of the r-f gain is time-consuming, tiring, and aggravating. To overcome this condition, the r-f gain control bus in the *NC-300* is brought out to the accessory socket so that an external r-f gain control can be used. One control is set for desired monitoring level and the other is set for desired receiving level. The accessory socket furnishes the operating voltages for the converters and future accessories. The "Mode" switch has one position termed "ACC" which connects one of the pins in the accessory socket to the audio amplifier. I-F voltage is also available on this socket.

Crystal Calibrator

A separate socket appears on the receiver chassis to accommodate the *XCU-300* crystal calibrator. One of the front panel knobs sets the position of the pointer to agree with the calibrator signal. This is a mechanical adjustment and in no way affects the receiver electrically. The dial is calibrated every kilocycle on the 1.8 to 2.0 Mc band; every two kc on the 80, 40, 20 and 15-meter bands; every 5 kc on the 11-meter band; every 10 kc on the ten meter band; and every 20 kc on the 6, 2, and 1¼-meter bands.

With the calibrator, frequency can be read as close as these figures without interpolation. Spacing is such that at least twice this accuracy is possible with interpolation. A type of Geneva movement is employed in the bandswitching section to allow the dial drum to continue to index around after the receiver has passed the last electrical band. This feature provides directly calibrated scales for 6, 2, and 1¼ meters while the receiver is electrically tuning 30 to 35 Mc. Field tests with the converters indicated operational performance equal to that obtained on the lower frequency bands.

Conclusion

The *NC-300* provides new operating thrills and enjoyment, living up to National's title "Dream Receiver."

Ol' Smokes' Special Services Dept.

Special Rates for Ear Bending

Describing bad locations, unethical opponents, out of band operation, landing in QRM, falling asleep when the band opens, burned out 304TL's etc.

Just listening——15¢ each

Listening with sincerity——35¢ each

Listening to descriptions of tough contacts by opponents that were lucky——10¢ per contact

Listening to description of touch contacts by opponents that were actually lucky——3 for 10¢

For "If" type of contacts

Listening to "if the rotator hadn't stuck," "if the snow static hadn't built up," "if the QRM hadn't covered him up," "if my power hadn't failed," etc.

This is really difficult listening to, and the rates are somewhat high. Three minutes——35¢, 10 minutes——60¢ (rates also by hour on request)

Listening to——

What's wrong with the band——50¢

What wrong with the ARRL——$1.00

What's wrong with the rest of the hams——10¢ each 12 for $1.00

Rates for sympathetic listening to description of your last contest.

General rates—

Listening to	*Listening time limit 5 min*
Rare DX catches	$1.00
Lost contacts	.50
Getting out when QRM is tough	.15
Getting out when QRM is really tough	.35
Getting out when the band is closed	1.00
Number of answers to one "CQ"	.25
Number of rare DX answers to one "CQ"	.35
Really rare one that answered your CQ	.50—3 for $1.00

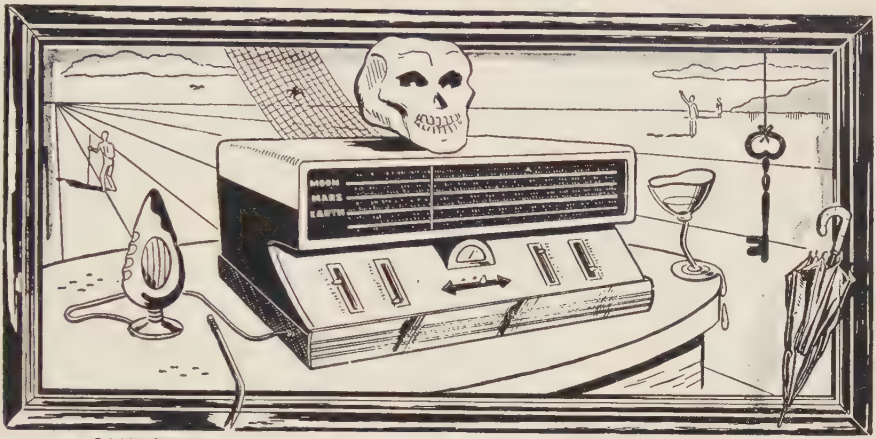
Qualified Rates	*Listening time limit 15 min*
Describing contest contact by contact	
On one band	$1.00
On any two bands	$1.50
On all bands	2.00

Special rates available for both week-ends of contest.

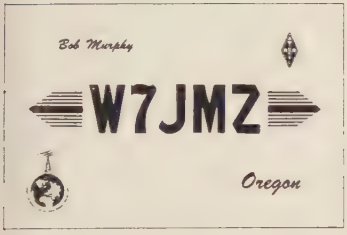
Reduced rates for description of how you worked WAS, WAC, etc.

W1FZJ

W8IFU



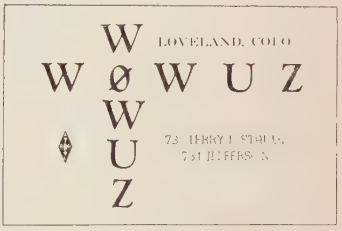
SAM CIRIN -- 5545 Montgomery Road -- CINCINNATI 12, OHIO

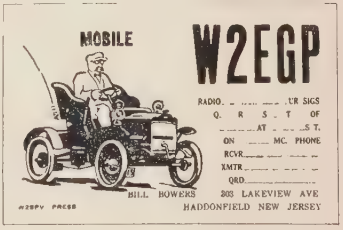


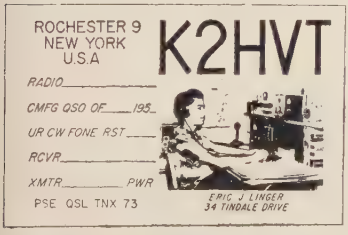
QSL CONTEST WINNER and runners up

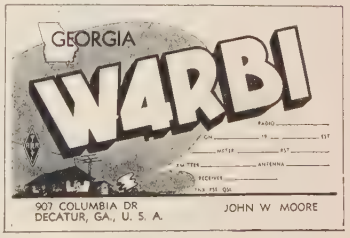
Alors! The cards are pouring in! Right after closing of the October contest, and a sizeable stack of very potential-winnerish cards have piled up for the November contest. We're not throwing any of them away (except duplicates), so cards sent in earlier are still eligible in the contest—but it's unlikely they'll have too good a chance, since the cards coming in look better and better. Surprising what a work of art the "average" ham can turn out when he really gets interested . . . and it's not too expensive to reproduce a card by one of the various methods, once you've created a master.

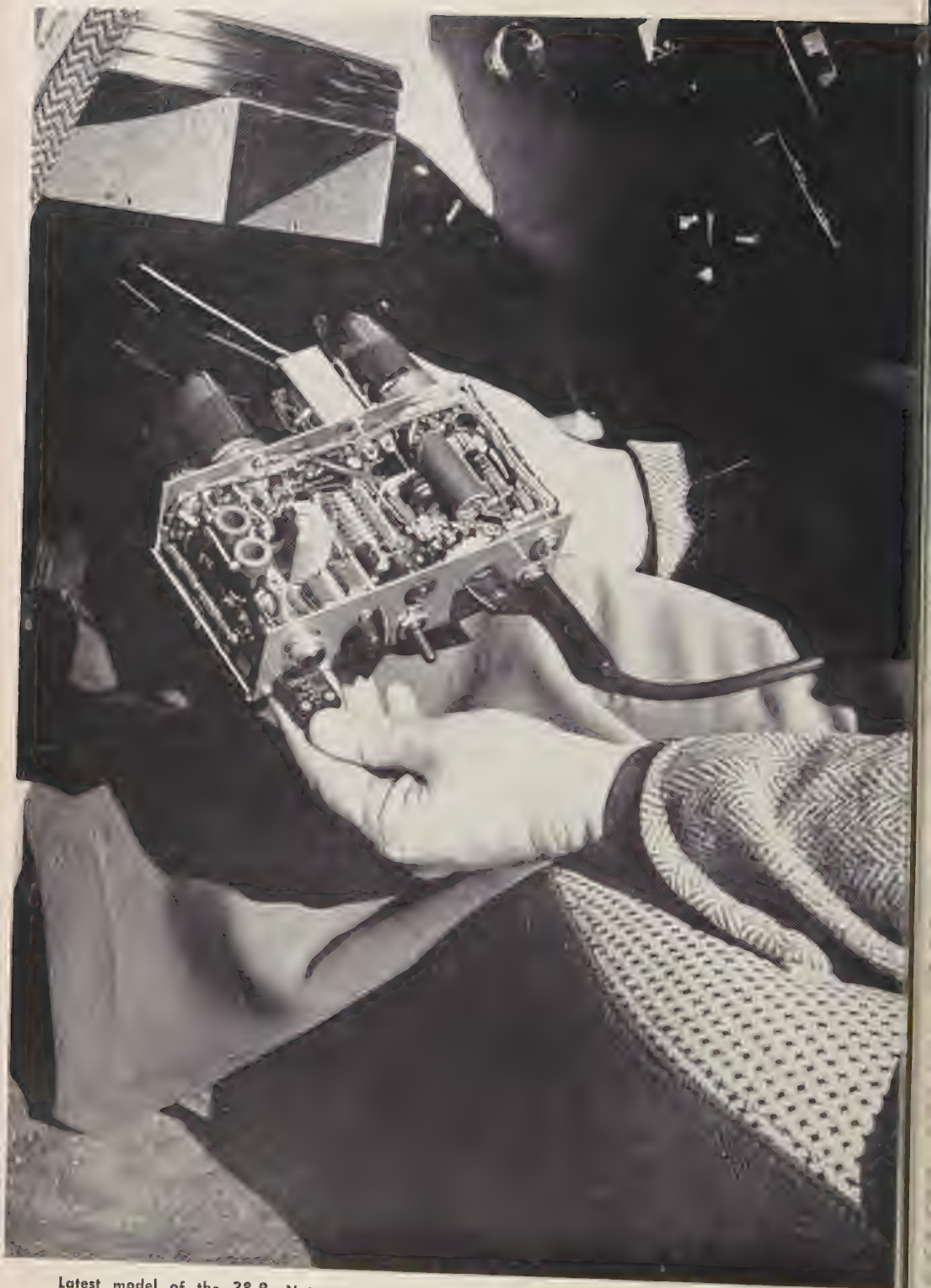
The prize, for the information of you latecomers, is a 2-year subscription to *CQ*.











Latest model of the 28-9. Note compact parts assembly and external mounting of tubes for adequate cooling. Metering jack, antenna loading and slug-tuned r-f doubler controls are on underside of chassis.

W6WYA does it again! Here's a new version of the famous 28-9 that will make ten-meter enthusiasts sit up and take notice

More On The 28-9

J. Roy Smith, W6WYA
2052 Venice St., San Diego 7, Calif.

From time to time many *28-9* users have asked, "Have there been any improvements in the *28-9* since 1952?"

Indeed, the *28-9* has progressed through the years. The new version has a change in the r-f driver stage, neon bulb tuning, a modulation and performance indicator, a type-operation control switch and an improved modulation transformer which increases modulation.

This transmitter is easily powered by either a vibrapack or a dynamotor. In most cars the BC receiver's power supply can be switched to the *28-9* and does a fine job with only a fraction of an *S*-unit less output.

Design

The *28-9* uses three tubes; one as an r-f driver, another as a class C amplifier and the third as an audio modulator. The r-f driver now uses a 12AU7 in practically the same circuit as the original 6J6 with the exception of the higher value grid-leak resistors, and higher plate voltage. The use of a 12AU7 simplifies wiring of the filament circuit in transmitters for use in new cars using a 12-volt system. The old 6J6's did not last long when the plate voltage exceeded 150 volts. The class C amplifier uses either a 6AQ5 or a 7C5. By choosing identical tubes of either type for the class C stage and the audio modulator, one spare tube serves as a spare for either circuit. The 7-pin miniature 6AQ5 or the loctal 7C5 are equally effective and they both have essentially the same characteristics. The 7C5 is slightly larger and dissipates the heat better. Also, the 7C5 loctal socket is larger, which makes socket wiring easier.

Both the r-f driver and the class C amplifier operate with grid leak bias. This is the simplest method for bias but does require adequate driving power. The final stage is standard except for the addition of the neon bulb "performance indicator." The pi network tank circuit is better for antenna matching and attenuation of harmonics.

In the audio modulator circuit, the high step-up microphone transformer eliminates the necessity for both an audio amplifier and a gain control. When the modulator grid is overdriven there is grid limiting in the high impedance transformer secondary, keeping the audio at a constant maximum level. The modulation transformer is a new wrinkle in an old system. It uses a 1:1.16 turns ratio autotransformer which increases the average modulation more than the usual 100 percent without overmodulating on negative peaks as occasionally happened in the original *28-9*. This transformer also serves as an output transformer for public address use.

The control panel as a part of the chassis is an important design consideration for simplicity and ease of adjustment. All controls requiring adjustment are now on the front panel.

In general, the redesigned *28-9* has retained all its previous advantages and important features and now has some added improvements too.

The R-F Circuit

The r-f driver uses a 12AU7 in a reliable, sure-fire circuit. The first triode operates as a modified Pierce oscillator using a 7 Mc crystal. By means of the resonant circuit, consisting of *L1* plus the circuit and tube capacitance, the first triode doubles in the plate circuit to 14 Mc. The r-f choke in the cathode is not critical. Its inductance may be anything from .5 millihenries to 2.5 millihenries depending upon preference and space available. The second triode performs as a second doubler to 28 Mc. It is seldom necessary to retune the r-f driver when changing frequency.

A 7 Mc VFO may be plugged into the crystal socket, replacing the crystal, but such a VFO must be capable of delivering a small amount of power—enough power to establish sufficient grid leak bias on the first triode.

The class C modulated stage is simplified to the bare minimum of parts. It uses a pi network as a tank circuit which does a good job of attenuating harmonics. The neon bulb, *NE51*, uses only 1/25 of a watt of power but is a very effective tuning, modulation and performance indicator. As the pi-network tank circuit is

resonated the lamp glows brighter. As the loading is increased the lamp dims. Modulating the signal causes the bulb to glow brighter with upward modulation and dimmer with downward modulation. A change in average unmodulated brilliance also indicates a change somewhere in the entire transmitter, hence it serves as a performance indicator.

The closed circuit meter jack is a "must" item. A meter is needed only during the initial tune-up operation. With a milliammeter plugged into the jack the total cathode current (plate, screen and grid) may be measured. When Switch *S1* is opened the screen and plate current ceases, leaving the meter indicating only the control grid current. When adjustments are complete, the meter plug is removed. Further plate tuning due to frequency changes can be accomplished by tuning for maximum brilliance on the neon bulb.

A hand-constructed frequency-rated plate choke may be used in place of the *Ohmite Z-28* choke, *RFC2*, using closewound number 30 enameled wire over a form ¼ inch diameter by 1¼ inches long.

Audio Circuit

The carbon mike is still the most dependable, effective and inexpensive of microphones. Hence, it is still used in the *28-9* along with the same mike transformer (now this transformer is made by three manufacturers: *Triad, Peerless of Altec-Lansing,* and *Thermador,* all located in Los Angeles). This transformer has a 1:84 voltage step-up, eliminating the need for an audio amplifier, and saving precious plate current. Furthermore, it acts as an effective speech-frequency band-pass filter, as its high impedance secondary is in parallel resonance at 1400 cps. This prevents wasting of power in audio frequencies not needed for effective communication. To eliminate the need for a mike battery much of the modulator tube cathode current is fed through the mike at the junction of *R6* and *R7*. Capacitor *C12* is essential to prevent audio oscillation and to retain all mike audio voltage within the transformer primary. A carbon mike needs about 30 to 40 milliamperes current, so nearly all of the cathode current is fed through the mike *R7* is to prevent cathode-to-filament breakdown should the mike circuit become opened.

The greatest *28-9* progress has been made in the modulation transformer. A special new transformer has been developed for this transmitter by the *Triad Transformer Company, 4055 Redwood Ave., Venice, California.* Although the idea for this transformer was published years ago, it was seldom used, having taken a backseat to the then new class B modulation. With this transformer* it is impossible to overmodulate in the negative direction an theoretically possible for the modulating voltag to reach the 150% modulation level in the posi tive direction without splatter. This increase the effective audio up to the peak cathod emission of the beam pentodes. It boosts the ef fective audio power and the results are amazing Occasionally signal reports are received suc as readability *5*, signal strength *zero.*

The r-f bypass capacitor *C8* serves also t bypass higher audio frequencies not needed i speech communication. This helps preven modulation splatter and unnecessarily wid sidebands. The overall audio response of th transmitter ranges from 300 to 3500 cps.

However, if one prefers, a replacement grad 5 watt push-pull output-to-speaker transforme may be used as the modulation transformer a shown in *figure 2*. The primary is used as 1:1 modulation transformer. With this circuit occasionally it is possible to overmodulate i the negative direction.

A *Signal Corps* 3-circuit mike jack, *J2* i recommended. This preferred jack fits th standard 3-circuit mike plug.

The audio circuit has the additional featur of being capable of being used as a publi address system. Switching off the screen switch *S1,* disables the class C stage and unloads the modulator. By switching a horn-type loud speaker to the speaker winding of the modula tion transformer, the 4 to 5 watts of audio can be heard for three blocks. The control circui of *figure 3* performs these operations with a knob.

Control Circuits

The control circuits consist of a send-receive relay and a three-pole four-position single deck rotary switch connected as shown in *figure 3*. The relay is actuated by the standard push-to-talk switch in the carbon mike. The relay coil should be selected for the voltage of the battery 6 or 12 v.d.c. A 6.3v. a-c coil can be made to operate on 6 volts either a.c. or d.c. by connecting in series a 4-ohm 5 watt resistor.

One set of relay contacts switches the antenna from the receiver to the transmitter during transmission. The other set of contacts is used to start the power supply.

If the receiver power supply is to power the transmitter, this set of contacts can be used to switch the receiver B+ from the receiver to the transmitter. Since the contact current in the midget relay is limited, it is necessary that another relay, such as a headlight relay with its built-in fuse, be placed ahead of the vibrapack or dynamotor.

The transmitter illustrated uses the switch and control circuit of *figure 3*. Starting from left to right the switch positions are (1) Transmit, (2) PA, (3) Rcvr-PA and (4) Calibrate. Position (1) is the normal on-the-air with push-to-talk control. In position (2) the Class C

*The detailed theory of operation is a bit lengthy and involved. It is reserved for a future article.

stage is in operation, the loud speaker is connected, and the mike has push-to-talk control for public address work. In position (3) the speaker lead wire from the receiver is tied in to the P.A. speaker. In position (4) the class C stage is disabled by opening the screen circuit, the power supply is automatically turned on.

R1, R2—100 K, ½ W.
R3—22 K, 1 W.
R4—15 K, 1 W.
R5—3.3 K, 2 W.
R6—2.20, 1 W.
R7—330, 1 W.
R8—1 M, ½ W.
C1—10 mmf ceramic tubular
C2, C3, C4—50 mmf ceramic tubular or disc
C5, C6, C7—.001 mf ceramic disc
C8—.005 mf ceramic disc
C9—500 mmf midget Mica or ceramic
C10—50 mmf midget variable
C11—140 mmf midget variable
C12, C13—25 mf 25 V. electrolytic
J1—Closed circuit phono jack
J2—Signal Corps. 3 circuit mike jack
J3—Motorola type ant. receptacle
T1—Mike transformer, 1:84 turns ratio (Triad A5X, Peerless KOO7X, Thermador 2L1784)
T2—Modulation transformer (Triad M-4Z)
RY1—D.P.D.T. send-receive relay (Advance MF/2c or equal, with proper voltage coil)
LH1—Lampholder, Dialight Co. #431
Lamp—S-51
RFC1—.5 mh to 2.5 mh
RFC2—Ohmite Z-28 or 1¼" closewound #30 enameled on ¼" dia. form
S1—S.P.S.T. or multiple switch (See text)
S2 — S.P.S.T. filament switch
L1—28T #24 enameled on National XR-50 coil form
L2—13T #20 enameled on National XR-50 coil form
L3—9T of B&W 3010 miniductor (#18 1⅛" long, ¾" dia.)

In this position, a meter plugged into the metering jack reads only class C stage grid current.

If the earphone jack as shown in *figure 3* is installed within an inch or so of the mike jack, a *Western Electric* operator's headset may be used if the plugs are modified and a send-receive switch is added.

Antenna Considerations

The *28-9* works best with a quarter wave whip antenna. Quarter wave whips have impedances of about 36 ohms, hence an impedance matching section is useful to raise the feed-point impedance as seen by the pi-network to effect a better control of loading. The matching section consists of a quarter-wave *(electrical length)* section (67 inches for 10 meters) of 52 ohm coax line, with one end connected to the antenna and the other to the transmitter or any length of 72 ohm coax line necessary to reach the transmitter.

A short length of coax line should be brought out through the chassis to connect the receiving converter to the relay receiver antenna terminal.

Power Supply

The *28-9* will operate with power supplies up to 300 volts at 100 milliamperes. A vibrapack is recommended. A PE-101c converted dynamotor makes a suitable power supply furnishing

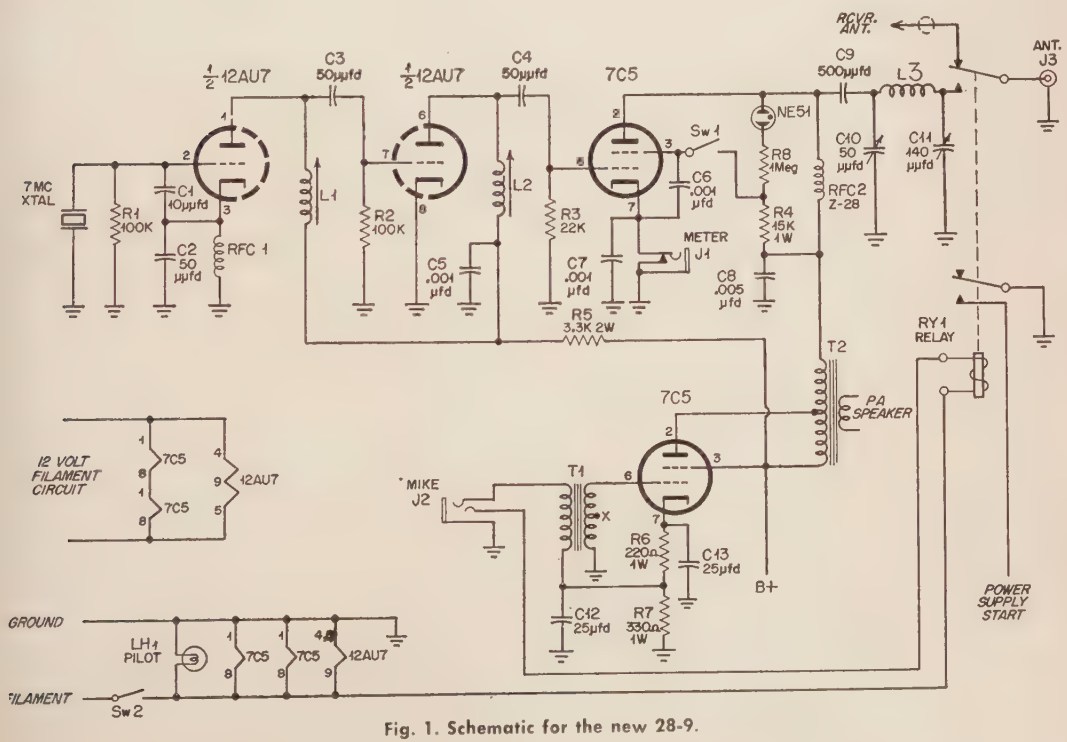


Fig. 1. Schematic for the new 28-9.

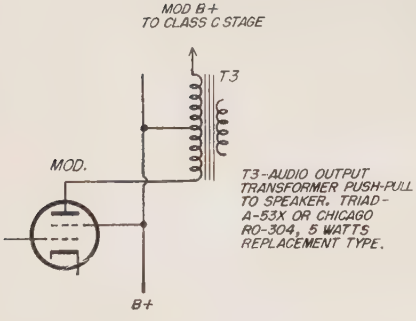


Fig. 2. Optional modulator circuit.

about 290 volts at 100 ma. The automobile-type headlight relay with fuse is essential to connect the vibrapack or dynamotor to the battery.

The power supply contained in the average automobile radio will do a very reasonable job of powering the transmitter. Many of the Washington, D. C. mobile stations have used their receiver power supplies to power *28-9's* to their satisfaction for some time. Should your BC auto receiver have push-pull audio output tubes (more often than not), the internal supply will have adequate power for your *28-9*.

Tuning Procedure

With the screen switch *S1* open or in the "calibrate" position, a meter plugged in the metering jack reads only the grid current. Using a 7 Mc crystal, *L1* and *L2* are adjusted for a maximum grid current of 3 to 4 ma. At this point, change the scale on the meter to read about 100 ma. When switch *S1* is closed or in the "transmit" position and the power supply is turned on, the meter reads the total cathode current. With *C11* set at maximum capacitance, plate tuning condenser *C10* is adjusted for a current dip. Observe that the neon bulb glows brightest at this point of current dip. If the cathode current dips at less than 45 ma. (assuming 300 volt plate supply), the capacitance *C11* may be reduced and *C10* reresonated as before. The process is repeated until proper loading is achieved. Now the meter is unplugged. Once the loading is adjusted, all future tuning may be done by observing the neon bulb glow.

In some installations, an additional fixed capacitor of 100 $\mu\mu$fd or so, placed in shunt with *C11*, may be necessary to reduce loading to 45 ma. cathode current.

Antenna loading should be kept low enough so that the plate current shows a definite dip at resonance in order to keep the tank circuit at sufficient level of *Q* so as to do its job at attenuating harmonics. At increasingly excessive loading the capacitance adjustment of *C10* at resonance (current dip and maximum neon bulb glow) becomes more displaced from it adjustment for maximum power in the an tenna. In every instance, the resonance or cur rent-dip position is the proper adjustment fo greatest harmonic attenuation and long life o the class C tube.

When parasitics are observed on a distant re ceiver (1000 feet distant) they probably ar caused by insufficient grid bias to prevent sel oscillation since adequate grid bias is controlle by the amount of grid drive.

When downward modulation is experienced it is probably caused by one of four situations (1) Insufficient grid drive or excitation, (2) Ex cessive class C stage loading, (3) Totally in sufficient loading or (4) too much voltage dro in the filament circuit; that is, too low filamen voltage at the class C tube causing low cathod emission.

Construction Hints

Here are construction hints which hav evolved from the building of many of thes transmitters. These hints will help you avoi some of the pitfalls of others' past mistakes Actually these suggestions apply generally t almost any equipment built.

Almost any reasonable arrangement of part will work successfully providing all r-f lead are kept short. By short, we mean not exceedin one inch in length, preferably ⅜ to ½ inch The arrangement illustrated in the photograp is very effective. But frankly it is a bit difficul for an inexperienced constructor. It is muc better for beginners to start with a large chassis, yet keeping all r-f leads as short a possible. As you plan the parts layout, orientat all the parts so as to require absolute minimu lead lengths.

Concerning wiring techniques, 28 Mc is prac tically in the VHF region and VHF wirin techniques should be used. All wire should b color-coded using the standard wiring colo code, namely: for B +, blue for anodes, gree for grids, yellow cathodes, orange screen grids brown filaments, black grounds and ground re turns and white for control circuits. Use onl stranded hookup wire. Use number 18 size wir in the filament and ground leads in the powe lead-in cable. Run the filament wire directl to the battery to avoid the voltage drop existin in the car's connectors, switches and wires. Ru all internal ground leads directly to ground t the nearest point on the chassis with very shor leads. Even at 28 Mc long leads have sufficien inductive reactance to cause all sorts of feed back paths and possibilities for parasiti oscillations.

Do not make mechanical joints in the wiring pigtails and parts leads prior to the applica tion of solder. It is not necessary and it is to difficult to correct wiring mistakes and mak changes.

Concerning the slug-tuned coils, the B+ connection should be at the end of the coils nearest the base. This places the iron slug in the "cold" end of the coil and conserves r-f energy. Place the tank coil *L3* so as to be as clear of other parts as possible. Leave adequate room all around the coil for the flow of those invisible lines of magnetic flux which surround the coil. There exists much energy in those magnetic lines of flux and to waste them in adjacent parts generates heat at the expense of your output power.

Place by-pass capacitor *C5* between the B+ end of coil *L2* and the coil's ground lug with leads as short as possible. All other by-pass and coupling capacitors should be wired directly at the tube sockets. Before installing the pi-network variable capacitors, ground the rotor terminal by solder or a snip of wire to the grounded parts of the capacitor. This saves many headaches later in troubleshooting. For r-f by-pass capacitors use only ceramic disc types. Disc capacitors also may be used for coupling but not for the feedback control capacitor *C1*.

The tube sockets should be bottom-mounting types with ground lugs as part of the mounting flange. The r-f tube sockets should be of ceramic or mica-filled bakelite. Tube shields are not necessary. The usual ones hinder the tube's cooling and shorten tube life.

It is recommended that the crystal socket be recessed about ⅜ inch behind the panel with an opening in the front panel to receive the body of the usual FT 243 crystal holder. This takes the mechanical strain off the holder pins, preventing pin breakage when the crystal is accidentally bumped.

The pilot-lamp holder should be the type wherein the bulb is accessible for replacement from the front of the panel by removing the jewel. Pilot lamps have a habit of burning out at the most inopportune time. The neon bulb should be mounted to the front panel in a standard ⅜ inch hole rubber grommet with the bulb extending only about ⅛ inch. Too much of the bulb's protruding affects too much capacitance from the bulb shell to ground causing the bulb to glow excessively. A bulb already glowing too brightly is useless as a performance indicator. Connect the neon bulb by soldering a piece of bus wire to the center connection of the bulb, wiring the other end of the bus wire to the plate connection of the class C final tube socket. The 1 megohm resistor is soldered to the base shell connection of the bulb. These connections also give adequate physical support to the bulb. This neon indicator will seldom need replacing when installed in this manner.

Conclusions

The *28-9* has several advantages over other transmitters. The filament and power supply drain on the car battery is low. The transmitter and vibrapack consume about 10 amperes from a 6 volt battery including filament and relay currents. The W6WYA *28-9* installation (transmitter and receiver) has operated in continuous contact for as long as six hours on the *Rambler's* one and only battery, and yet the battery started the car with no difficulty. The rig has full high-level modulation with speech bandpass quality audio. All the audio power is concentrated on the speech frequencies necessary in "getting through."

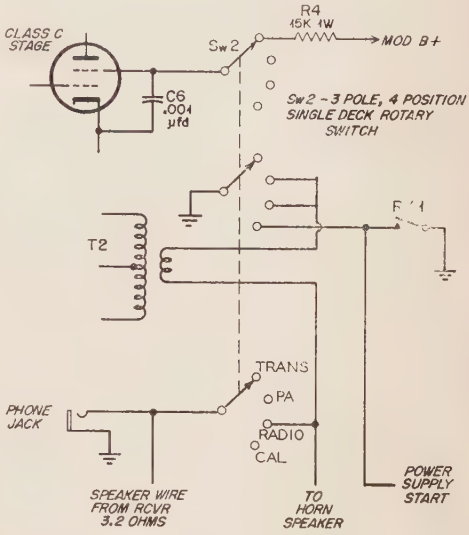


Fig. 3. Suggested control circuit for the 28-9.

The complete circuit is simple and foolproof. When the wiring is kept short, the usual bugs just don't appear. The control panel is an integral part of the chassis. The transmitter can be built small enough to be placed within easy reach beneath the dash of almost any car without sacrificing leg room. The appearance of the neatest car is not affected in any adverse manner. The neon lamp is a very effective performance evaluator. At a glance one can interpret antenna loading, final tuning, modulation and grid drive. To change frequency it is necessary only to change the crystal and resonate the plate tuning for maximum brilliance of the neon glow lamp. The accessibility of the crystal socket on the front of the chassis makes easy a quick change of crystals.

When the loading is adjusted to where the plate current dip is reasonably pronounced, the set has negligible harmonic radiation. The writer's transmitter, without additional filtering, causes no TVI when located 50 feet or so from the TV antenna.

The overall circuit is simple and reliable. It contains no parts which are not needed. If good construction techniques are used, there are no areas of probable equipment failure.

New Life for the Old Superhet

Stan Harwich, W2MCB
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Despite the wide variety of expensive equipment available, Ham Radio is one of the world's most democratic hobbies: Here's one way to be a millionaire in DX on a piggy bank budget.

You may not be wealthy, but if you are rich in old fashioned American ingenuity, you can get top-notch sensitivity out of that sluggish old receiver, or make a second-hand job pull in as much DX as a high-priced late model.

The First R-F Stage

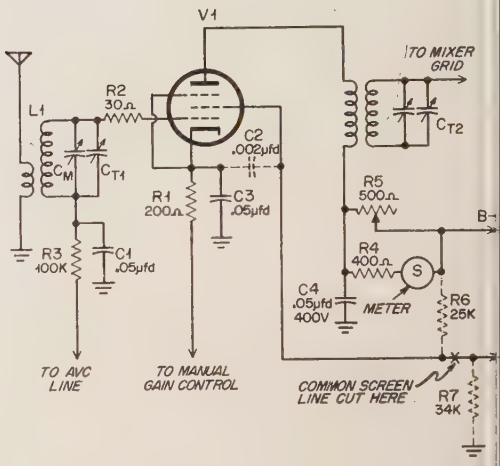
Where sensitivity and signal to noise ratio are concerned, the first r-f stage is crucial. Lack of gain at this point will debase the signal-to-noise ratio, and while gain in later stages may help somewhat, as soon as you hear that front end hiss, you've gone as far as you can go with i.f. and audio stages. So let's concentrate on that crucial first r.f.

Many of the older receivers which are fully equipped in other respects just don't have pep on ten and twenty. Generally, these receivers employ low or medium mutual conductance tubes similar to the 6SK7 in the r-f stage. Since it is well known that these tubes perform inefficiently, especially on ten meters, many a ham has tried the obvious panacea—plugging in a "hot" tube with the same socket connections. The results are generally disappointing: little or no increase in gain, and plenty of noise.

What Went Wrong?

This trick is like a transfusion with the wrong type of blood: the tubes in a receiver have to work together with the same type of teamwork as the red corpuscles. The correct tube has to be hunted in the tube manuals with great care, and changes must be made where necessary in the receiver to accommodate it. Let's consider a case history, that of an old Hallicrafter's SX-24, and go on a treasure hunt for the right tube.

The old SX-24 uses a 6SK7 r-f tube. The tube we are looking for to replace it must have high mutual conductance for good high frequency gain, but it must also work properly in a receiver designed for a 6SK7. It should preferably have an octal base with similar base



connections in order to avoid a major alteration job. Let's list some desired similarities before we go on our search:

1. Similar base and connections.
2. Similar inter-electrode capacities.
   (So that it will not require alteration of front-end coils)
3. Similar operating voltages and currents
   (Where series string filaments are not used, voltages on other elements usually can be easily altered)
4. Similar a.v.c. control characteristics.

The Candidates

Our search yields the following likely tubes with similar bases, connections, and voltages plus high mutual conductance:

6AB7	6SG7
6AC7	6SH7

Of all the candidates, the 6AC7 has the highest mutual conductance, 9000 micromhos, and is the one most frequently plugged in "to see what will happen." It is usually a flop. Let's see why. First, it has an input capacity of 11 $\mu\mu$f., almost twice as high as that of the 6SK7. This high capacity, undesirable in itself, may make correct high frequency realignment impossible with some receivers, and will certainly worsen performance unless realignment is done.

Second, it requires 150 screen volts to yield its 9000 micromho performance; only 100 volts furnished to the original 6SK7. (Screen voltage

however can usually be increasd by a simple alteration in screen circuits).

Third, and most importantly, it is a sharp cut-off type. This makes it definitely incompatible in an SX24. The 6SK7's in the SX24 i-f amplifier are on the same a-v-c line as the r-f stage, and they are remote cut-off types. Consequently, a gain equilibrium will be established under a-v-c action in which the r-f stage (6AC7) will have its gain choked off by a-v-c bias. This will occur at quite low signal levels, debasing the signal to noise ratio. Ironically, since the S-meter in this receiver reads r-f stage plate current, S-meter readings on even the weakest signals will be very high, but they will be meaningless. While it would be possible to disconnect the stage from the a-v-c line, the penalties would be rather severe. They are, to wit:

1. Impairment of receiver a-v-c action.
2. Loss of S-meter action, requiring redesign of S-meter circuit.
3. Intermodulation interference when strong signals are present.
4. Blocking on local signals.

Having eliminated the 6AC7, let us examine the other candidates:

6SH7—It too is a sharp cut off tube.

6SG7—This is a tube with semi-remote cut off characteristics, but it will not work well on our a-v-c line unless a modification is made to decrease the applied a-v-c voltage. (This could be done by using a resistance voltage divider between the a-v-c line and ground. The resistances should be bypassed to ground. Since both the resistances and bypass condensers affect the a-v-c time constant, they should be similar in value to the other components on the a-v-c line.) Screen voltage would have to be increased to 150 volts.

6AB7—This one looks good. It has high mutual conductance, full remote cut-off characteristics, input and output capacities similar to those of the 6SK7, and similar base connections. Filament current is 0.15 amp. higher, but this should be easily handled by the receiver. (If series string filaments were used, we would *have* to use the 6SG7 with its 0.3 amp. filament). As a bonus, the cathode resistor in the receiver, 200 ohms, is just right. (If it were not, it would have to be replaced with the correct value for the new tube.)

The screen, however, requires 200 volts, necessitating a modification. It is a very worthwhile job nonetheless, since high screen voltage improves high frequency input impedance; the 200 volt screen makes the 6AB7 a notable performer on ten meters.

Disconnect the screen from the common screen line, and shunt the screen line to ground with a 34,000 ohm 1 watt resistor. (This maintains correct screen voltages on the remaining stages.) Connect the 6AB7 screen to the 250 volt plate supply line through a 25,000 ohm, ½ watt resistor, and bypass the screen to the cathode at the tube socket with a .002 or larger ceramic or mica condenser. (This is not necessary if a bypass condenser is already provided at the tube socket.)

Re-peak the r.f. grid trimmer and the mixer grid trimmer on each band. Other trimmers need not be adjusted if the receiver is in good alignment. (The r-f grid trimmer should be peaked with the antenna used on each particular band actually connected to the input, and the receiver tuned to the high end of that band. Where two bands are covered by one band switch position, peak on the higher frequency band; no adjustment is necessary for the lower frequency band, and low frequency end adjustments, if provided, should not be touched.)

Be sure that the impedance of your feed line matches your receiver input impedance on each band. This is very important.

Instability

Your new, high gain tube may cause oscillation or instability in some receivers. Correct parasitic oscillations by putting a 50 ohm *non-inductive* resistor in series with grid 1 at the tube socket. A similar resistor in the screen circuit between the screen bypass condenser and the tube may help. Bypass condensers should be small mica or ceramic types, leads should be short, and connected directly to the tube socket.

Regeneration or oscillation on lower frequency bands is usually due to high tuned circuit impedances. If it occurs, back off the r-f gain control. If this tendency to oscillate is excessive, increase the cathode resistor until stability is obtained. (Excessive cathode resistances will seriously affect ten and twenty meter performance, and should be avoided, if possible. It may be wiser to slightly mis-align on a low frequency band to avoid oscillation, than to increase cathode resistance.)

In our sample SX24, no instability at all was noticed, except on the broadcast band. Here, a-v-c action on even out-of-town stations washed out this instability completely.

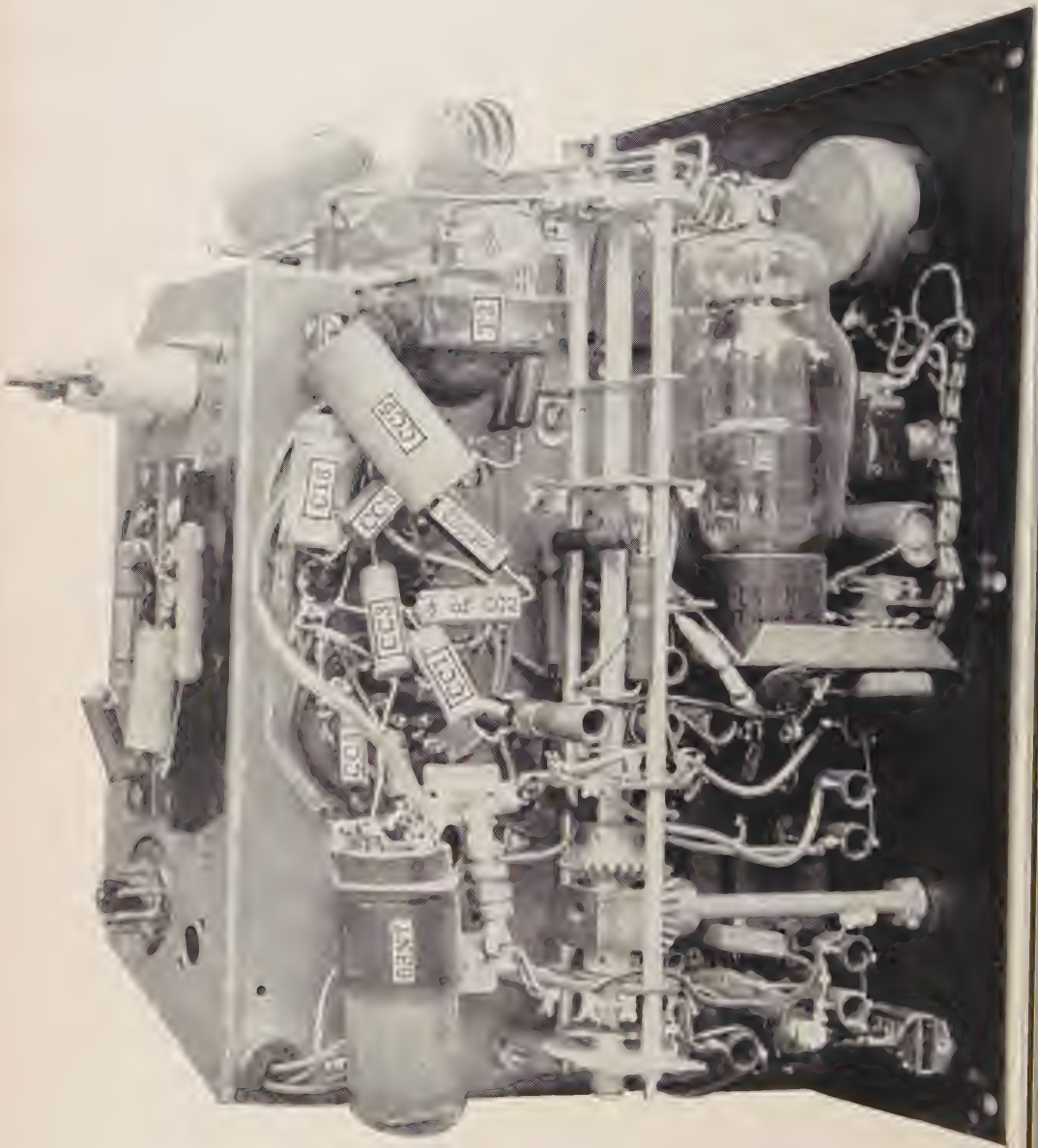
S-Meter

In the SX24, the S-Meter is connected to read r-f stage plate current. Since the new tube draws somewhat more plate current than the 6SK7, it was necessary to shunt the S-Meter with a small variable resistor.

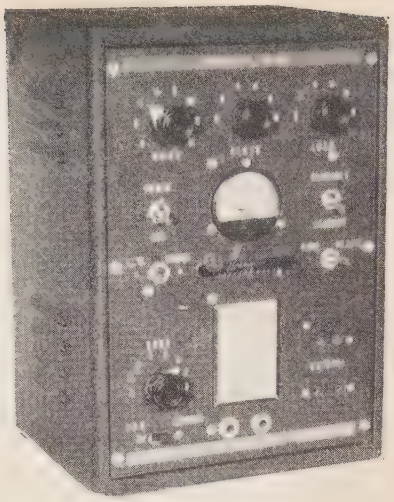
This analysis and method will work well with most receivers, if a suitable high gain tube can be found. Just remember to pamper your new tube with correct voltages and circuit values, and do not fail to take account of its a-v-c control characteristics. Then touch up your trimmers with your best antenna connected, and sharpen your ears for DX!

More Modulation For The

Louis L. Taylor, W8LVK
319 Summit St , Granville, Ohio



Bandmaster Senior



Liking the economy of carbon microphones, ut not liking to have to shout myself hoarse y the end of a medium-length QSO, I de- ided to hop up the speech amplifier of my *Harvey-Wells Bandmaster Senior* (TBS-50C). his transmitter is used by W8LVK on all mateur bands, plus two MARS frequencies, oth fixed and mobile. It is mounted in the ar so that it can be removed in about 30 econds, and it takes still less time to install n the shack.

As wired, the modulator of the Harvey-Vells consists of a microphone transformer (T_1) which couples a carbon microphone to he grids of two push-pull 6L6's. These 6L6's ct as the plate modulators for the 807 final. he change consisted of disconnecting the econdary T_2 from the 6L6 grids and con- ecting it, instead, to the grids of 6SN7 dual- iode operated as a push-pull amplifier. This SN7 was in turn R-C coupled to the two L6's. The R-C coupling was designed to be db down at 400 and 3000 cps. Attenuating elow 400 cps was desired so that the modula- on level could be kept high without causing vermodulation by the low voice frequencies, hich carry little intelligibility but a high per- entage of voice power. Attenuating the highs prevents unnecessary broadness of the signal, leaving all the "punch" in the most efficient audio range.

Figure 1 shows the circuit as modified. The points marked "X" were cut and the circuit inside the dashed-line box was added. Do not mistake this dashed box as a shield, as no shielding other than that provided by proper placement of components was used. Single letter notation (such as *R-17*, *C-18* etc.) are *Harvey-Wells* original components, while the

[*Continued on page 40*]

Modification Component Values

RR1, RR2—270K, ¼ watt
RR3, RR4—100K, ¼ watt
RR5—1350 ohms, ½ watt
RR6—250 ohms (see text)
CC1, CC2—.0025 μfd. (see text)
CC3, CC4—.002 μfd., 600v.
CC5—8 μfd., 450v.
CC6—100 μμfd. mica
CC7—75 μμfd. mica

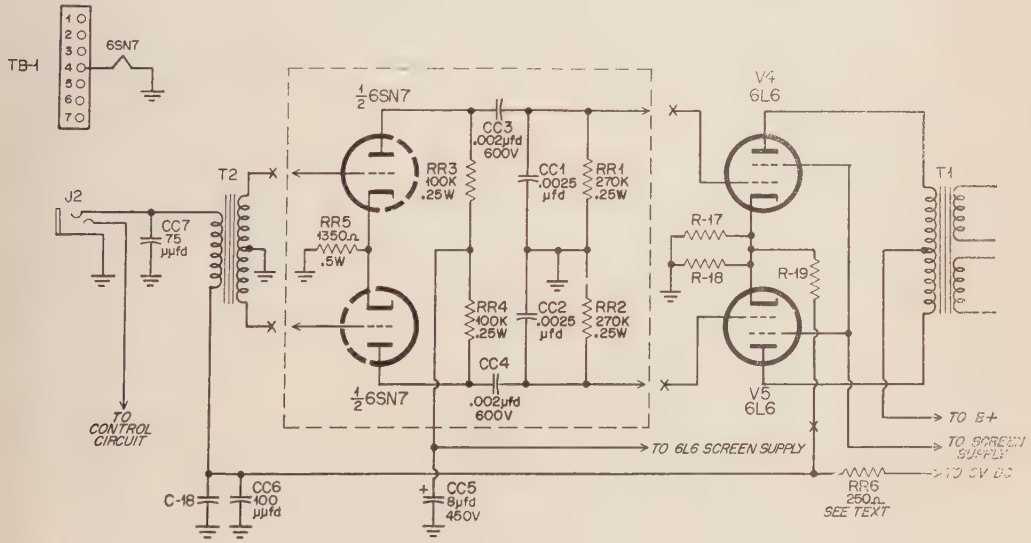


Figure 1.

420 on a Budget

easy conversion of the very inexensive APS-13 adds 420-Mc operation to any 2-meter station

Donald L. Stoner, W6TI
Assistant Professor of Electronics
Chaffey College, Ontario, Calif.

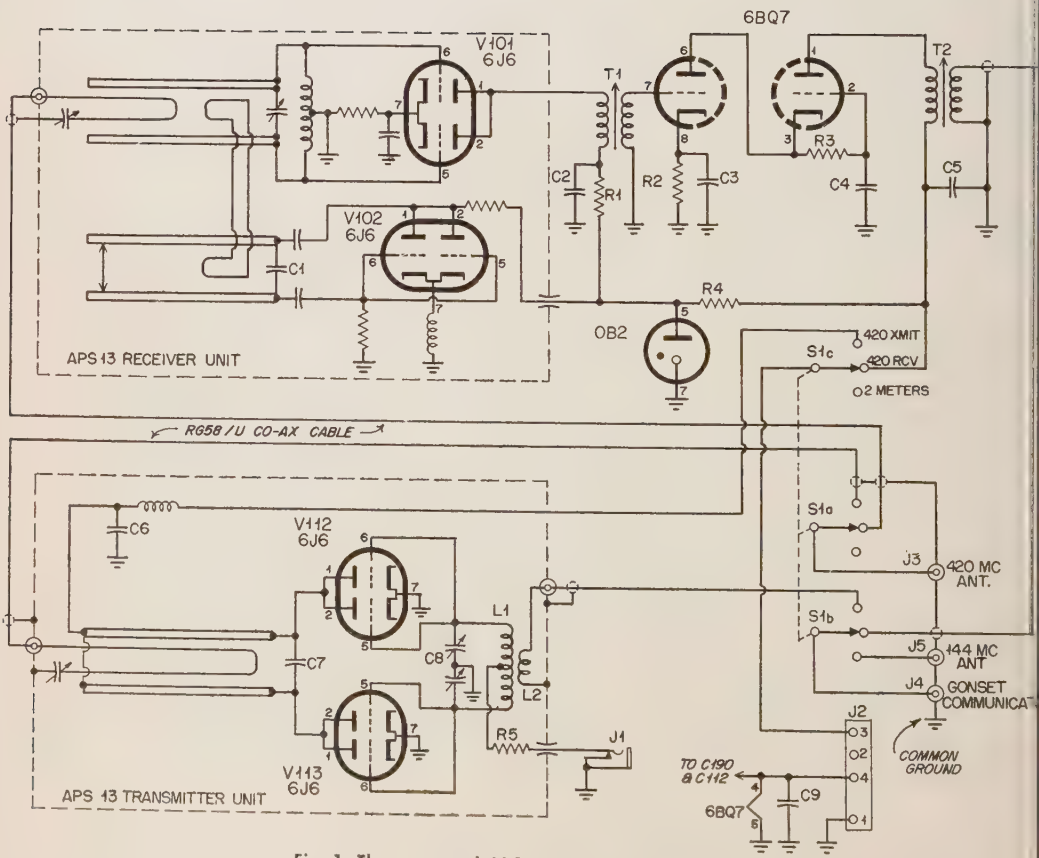
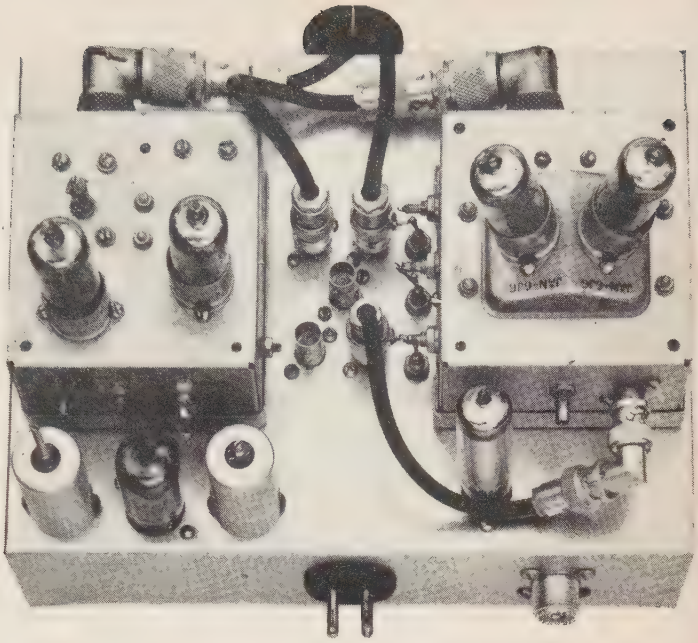


Fig. 1. The converted APS-13 Transmitter-Converter



The Complete Transmitter-Converter

Those who have used the modulated oscillator either on two meters or on 420 megacycles, know its limitations. With that thought in mind, this rig was designed to provide a crystal controlled signal at minimum cost. Because of the popularity of the *APS-13* as a modulated oscillator, this unit was considered a natural for modification. The *APS-13* can be obtained at almost any Los Angeles surplus store for $3.98, less tubes and dynamotor. The rest of the components necessary to receive 420 Mc signals will bring the total cost to less than $10.00.

The 6J6 push-pull modulated oscillator is converted to a tripler to 420, driven by a Gonset Communicator. Any two meter transmitter capable of 5 watts will drive the 6J6's to full power output. Although the tripler tubes are running class C, it is only necessary to modulate the two meter rig and the output of the 420 tripler will be almost fully modulated. Therefore no external modulator is necessary for the 6J6's. No, I don't know how it works either, but it does.

The 6J6 oscillator-mixer r-f section can be used as a converter by changing the local oscillator frequency and constructing a simple cascode i-f amplifier. If the oscillator is adjusted to operate on 288 Mc, it will beat with 432 Mc signals to produce an intermediate frequency of 144 Mc, and 436 Mc will fall at 148 Mc. Thus, the most-used portion of the 420 band can be tuned on any 2-meter receiver. The 288 Mc oscillator need not be crystal controlled because of the wide bandpass of most 2-meter receivers (*Communicator, 522,* etc.). Possibly the drift would be objectionable if a communication receiver were used as the i-f amplifier. Both r-f units, the cascode i-f amplifier, and the switching arrangement are mounted on a 7 X 9 chassis with plenty of spare room.

R1—1000 ½w.
R2—150 ohms ½w.
R3—470,000 ½w.
R4—10,000 2w.
R5—68,000 2w.
C1—12 μμfd. silver mica.
C2, C3, C4, C5, C6, C9—1000 μμfd. 400 volt.
C7—2 μμfd. silver mica.
C8—E. F. Johnson 9MA11 "butterfly" variable condenser
J1—Closed circuit earphone jack.
J2—4 pin socket, Amphenol #78—RS4
J3, J4, J5—UHF or BNC female coaxial connectors
S1a, b, c — Centralab #2521 (see text)
L1—5 turns #20 tinned, ⅜ inch diameter, and spaced ⅛ inch between turns
L2—2 turns #20 plastic covered, closewound on coil L1. (see text)
T1—3 turns #20 plastic covered, closewound on T-108. (see text)
T2—Same as T1, closewound on T-110

The Transmitter Conversion

The transmitter and receiver r-f sections are removed and the rest of the APS-13 discarded, although some of the condensers will be used later. The filaments should be rewired first. This is accomplished by clipping the wire between pin 4 of *V112* and *V113* and grounding each end. The wire connected to *C-183* is moved over to *C-190*. This will put both 6J6's in parallel and leave *C-183* blank. *L-137* and *R-156* are removed and both pin 7's grounded with as short a wire as possible. Remove the wire between pin *5* of *V113* and pin *5* of *V112*. On each pin *5*, connect a piece of tinned wire 1 inch long, that extends to the rear of the chassis. In the center of the rear apron drill a 3/16-inch hole for the grid tuning condenser. One inch to the right mount a BNC type coaxial fitting. This is the input connector for the grid coil link.

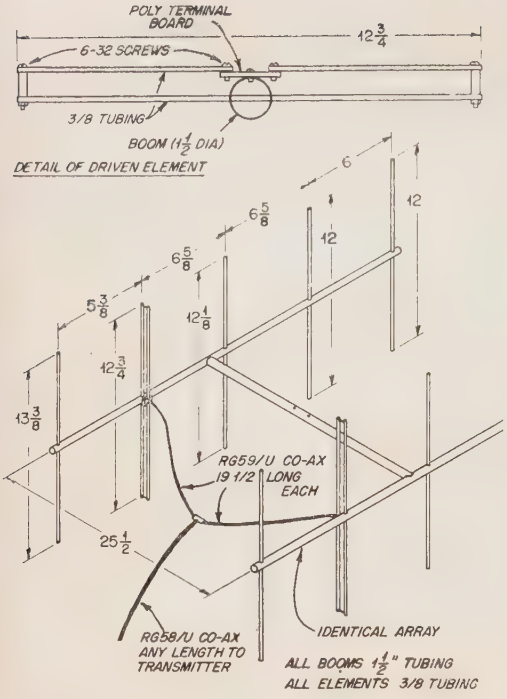


Fig. 3. Twin-5 Array for 432 Mc.

After the butterfly condenser is mounted, the two wires from pin *5* of each 6J6 are connected to each side of the condenser. Be careful not to get the wire on the wrong two pins as it will cause a grid to grid short. The 68K grid resistor is connected to the exact center of the coil. The other end of this resistor goes to the unused condenser, *C-183*. A two turn link is inserted in the center of the grid coil and connected to the BNC connector. The last step is the addition of a condenser from the junction of *L-133* and *L-134* to ground. Do not forget to install this capacitor or the unit will not triple. The inductance, *L-133*, is resonant at 2 meters and if it is not bypassed the 6J6's will simply try to amplify the 2-meter energy from the driver.

Converting the Receiver

The receiver is somewhat easier to convert. The conversion consists of changing the filaments to parallel operation and moving the oscillator frequency to 288 Mc. Rewire the filaments as shown in the diagram, being careful not to let the bare wire chokes touch the chassis. The oscillator frequency can be changed by adding a 12 uufd. silver mica condenser across the quarter wave lines at the point where *C-117* and *C-118* are connected. Use the best quality condenser available or drift problems might be encountered. With the slider almost to the front of the bars, the frequency will be about 288 Mc.

The cascode amplifier will improve the signals by about 8 db. The neutralization coil was not used in the original model and no trouble was encountered with oscillation. The 144-Mc i-f cans *T-108* and *T-110* were removed from the *APS-13*. The condensers, resistors, and coils were removed from the cans and the coil form cleaned with fingernail polish remover. The slug

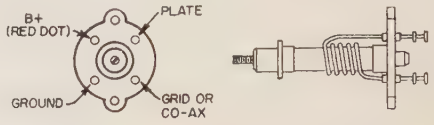
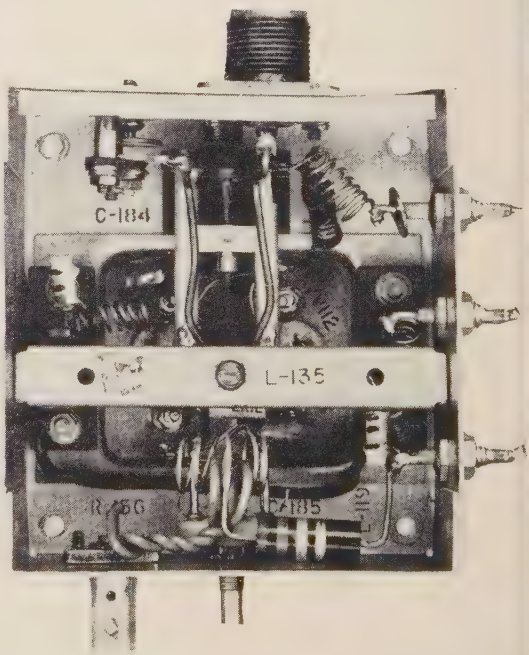
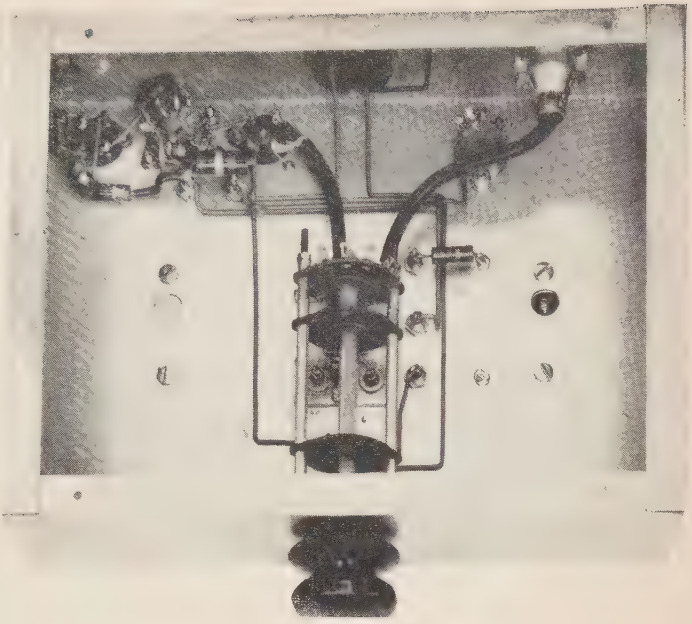


Fig. 4. Coil details.

should be removed from the bottom of the coil and inserted in the top hole. The clip should be moved also. After the terminals are clean, solder a 3″ piece of #20 plastic covered wire to any of the four terminals. Place a dot of red nail polish next to this terminal. To the next *counter clockwise* terminal solder another identical piece of wire. Keep the wires tight together and wind 3 turns on the form. Return the wire that was connected to the terminal with the red dot to the next clockwise terminal from the red dot. Connect the remaining wire to the remaining terminal. This type of winding is called a *bifilar* coil and because of the tight coupling, will have a good "Q" over the entire 2-meter band. Both coils are constructed in the same manner and they should be wired as shown in *Fig. 4*. Voltage regulation is necessary in the receiver oscillator supply.



Transmitter unit, bottom view.



Main chassis, bottom view.

The receiver-transmitter switching arrangement is somewhat elaborate, but it can be eliminated if you do not mind screwing and unscrewing connectors. Although it is poor high frequency practice to use a wafer switch for antenna switching, there seems to be no loss in the system. The coaxial connectors are mounted directly above their respective switch terminals and leads no longer than half an inch make the connections. The RG-58/U antenna leads from the transmitter and receiver to the switch are an electrical half wave, 8½ inches. This insures switching at a low voltage point where the losses will be less. There does not seem to be an increase in signal strength by connecting the antenna directly to the receiver. B-plus is switched in the front wafer section.

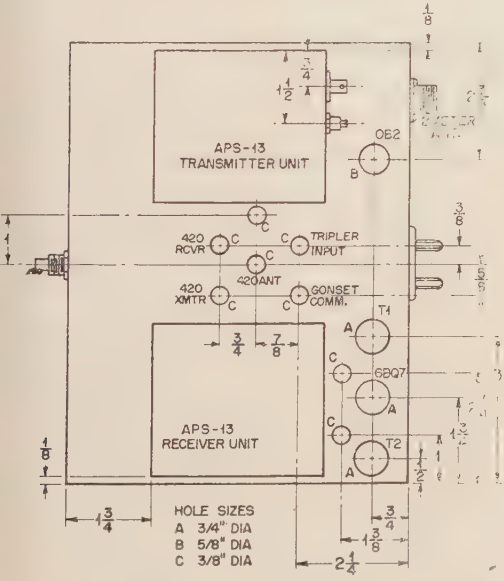


Fig. 2. Chassis layout.

No details are included for constructing a power supply. The construction of power supplies is covered fully elsewhere. The power supply requirements are 6.3 volts at 3 amps. and 250 volts at 60 ma. With 250 volts on the 6J6's, the plate current is about 55 ma.

Testing and Alignment

The first step is to align the 144 to 148 Mc i-f amplifier. To do this, connect the cascode amplifier output to the two-meter receiver and tune it to 146 Mc. Peak up the input and output bifilar coil slugs on noise. The peak should appear at the center of the slug travel. The best way to align the oscillator-mixer circuits is to have a local ham put out a crystal-controlled signal on 432 Mc or as near that as possible. Tune the oscillator screw very slowly until the signal is copied on the 2-meter receiver at the 144-Mc point on the dial. The oscillator adjustment is the screwdriver slot in the upper left hand corner of the chassis. Next, peak up the mixer adjustment that is located directly above the coax connector. The last step is to adjust the link coupling above the chassis and the tiny variable condenser to the right of the coax condenser. They are both adjusted for maximum signal strength. If a noise generator is available, the alignment can be done a little more accurately.

To adjust the transmitter, connect the 2-meter transmitter to the input of the 420-Mc tripler. Do no apply plate voltage to the 6J6's at

this time. A crystal providing output between 144 and 145.3 Mc should be used in the two-meter transmitter. Adjust the grid condenser for resonance by observing the 6J6 grid drive on a 0-2 ma. meter plugged into the test jack. Varying the link will also affect the tuning of the grid circuit. Therefore both the grid condenser and the link should be adjusted for maximum grid current. Anything in excess of 1.5 ma. grid current is sufficient. To check the transmitter ouput, construct a dummy load by wiring four #47 pilot bulbs in parallel on a coaxial connector. Connect this load to the transmitter output and apply plate voltage. Run the slider toward the front of the lines until the dummy load lights up. If resonance occurs too near the front of the lines, it may be necessary to add a 2 uufd. silver mica capacitor across the ends of the lines. Tune the reactance condenser and link coupling adjustments for maximum bulb brilliancy. The bulbs should light up to half normal brilliancy, indicating about 5 watts of 420-Mc energy output. Five watts of power output may not sound like much, but if you can get it up in the air, the antenna gain will really give your signal a wallop.

The changeover switch used in the model shown here was obtained at a local surplus store. It is almost identical to the *Centralab #2521* except for the length. The Centralab switch should be submounted to line up with the coaxial connectors.

The coax connectors shown in the photographs are really an unnecessary refinement and were used only because they were available. The coaxial cable can be soldered directly to the switch, eliminating the connectors. Grommets should be installed in the ⅜-inch holes located in the center of the chassis. Be sure to connect all braids to a common point to prevent a m match. The power leads for the transmitter through the ⅜-inch hole nearest the trans ter unit. The two ⅜-inch holes at the rea the receiver unit are for the power and i-f le The i-f lead is centered in the hole to pre by-passing of the i-f signal.

The chassis, a *Bud #1192*, is 7X9X2 z plated steel. The aluminum version, *#AC-* could be used instead.

Of all the antennas tried, the *Twin 5* and collinear array were the best. The *Twin 5* the easier to construct and the dimensions u at W6TNS are shown in *Fig. 3*. The transmi and antenna should be adjusted for maxim field strength. Naturally, the antenna should installed as high as possible.

Now you're all set for 420 and not too mu strain on the wallet either. As soon as you swing your beam around this way, I need more states for WAS.

W6TNS, "Twin Noise Squelch," though only licensed since 1952 is well known in Southern California. Don has been heard and seen on 420 T single sideband, pedestria portable, and all bands mobile. First love is 2 meters and he can usually be heard from some mountain top trying to w that elusive DX. Presently building a 2 meter Kw. to save wear and tear on the car. Occupied as Assistant Professor in th Electronics Dept. at Chaff College in Ontario. Addre Box 137, Ontario, Calif.

MORE MODULATION

[*from page 35*]

double-letter notation (*RR5*, *CC7*, etc.) are added components.

The photographs show how the 6SN7 was mounted. A small right-angle bracket holds one side of the tube socket and a #18 wire grounding pin 8 for filament return helps to steady the socket and provides solder points for other ground returns. Individuals with a desire for more mechanical rigidity could make a complete bracket if desired, but the one pictured has bounced around in a Ford for almost a year now. A 12AU7 could also be used satisfactorily instead of the 6SN7, and would be easier to mount. I happened to have a 6SN7 around when the job was started. As indicated in *Figure 1*, the filament voltage for the added tube is obtained from the filament circuit connection #4 on strip *TB1*, located on the back of the transmitter. This point will be at 12 volts above ground when the transmitter is connected for 12 volt operation, wh means that a 12SN7 merely be substituted make the change-over.

Note in the bottom view photo that th are two places where two condensers are h wired in series. These are .005 ufd conden so connected to obtain .0025 ufd for the bypasses for the 6L6's (*CC1* and *CC2*). capacitance larger than .0025 ufd is used, high frequency cut-off will be lowered.

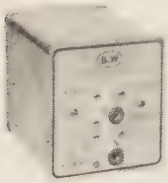
If a modulation control is desired, the 2 ohm microphone voltage dropping resi (*RR6*) could be replaced with a 400 or ohm potentiometer. This is advised as 250 o was experimentally found to be the right with the voice habits and the microphone u here (*a Western Electric F3*). Other comb tions may require different-sized resistors.

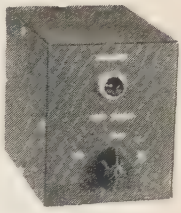
Without this modification I could get a 1 over 60% modulation from the transmi and the weak-voiced XYL could barely heard more than a mile away when she kibit over the mike. Since modification, 10 modulation is very easy for both of us.

T-R Switches

S. K. Lackoff, W2FQX

484 Sunderland Rd., Teaneck, N. J.





	Transitron	B&W 380	"Tenna Switch"
Frequency range	80-10 mtrs	160-10	160-10
Power-handling capacity	1 kw (above 400 watts, max. SWR 1.5/1)	1 kw	1 kw
Line impedance	50-70 ohms	52-75	50-300 or higher (see text)
Receiving gain or loss	Loss 1 S-unit (6 db) or less	Gain 6 db at 3.5 Mc, 0 db at 30 Mc.	Gain 12 db at 1.8 Mc, 1 or 2 db at 30 Mc.
Transmitting power loss	negligible	negligible	negligible
Powered by	self	110v	110v
Price	$9.95	$23.70	——

Amateur radio antenna switching techniques changed rapidly during the years preceding and following World War II. To review the advances, let's take a long look back to the days when the principal device for antenna switching was a heavy knife switch. It was very cumbersome by today's standards but it was the prototype of all transmit-receive switches—a survivor from the ancient days of spark transmitters.

Breadboard Transmitters

It survived principally because it was available and somewhat suitable. The ham c-w transmitter was usually of breadboard design. These antiques sometimes included a coupled s.p.s.t. switch to connect a-c line power to the plate supply when the switch was in the transmitting position.

During this early period amateur activity was still on relatively low frequencies. It was important to produce a good ground wave. The rapid adoption of c-w transmission did not alter this consideration but by the time of the outlawing of spark transmitters, most of those old-time heavy knife switches were becoming obsolete.

Lighter Switches

Light receiving-type switches, though inefficient by modern standards, came into general use. They were adequate for the low power outputs of that period. Transmitters were still breadboarded, with panel-mounted meters for antenna current, plate current and filament voltage. The compact receiving-type switches could be safely and conveniently mounted on the antenna current meter panel.

The modern era of amateur transmitters began with the development of higher frequency bands. Gradually breadboard and semi-breadboard transmitters disappeared. Most hams adopted commercial-type rack mounted units, and during this transition r-f power amplifiers came into use.

Higher power outputs increased the importance of efficient antenna switching. To conveniently and effectively switch increased antenna inputs, manufacturers developed antenna relays. They were relatively expensive components that usually required a separate power supply.

Functional Change

At about this time the function of the antenna switch changed from an engineering viewpoint. The trend toward the higher frequencies decreased the importance of ground switching. At the higher frequencies there was no need for ground switching. Ground waves ceased to be a transmission consideration.

Radar Techniques

Then in a few years modern radar techniques were developed. Early systems operated at frequencies close to the increasingly popular h-f ham bands. Transmit-receive switching for radar created special problems. Available switching time almost disappeared, dropping from seconds to micro-seconds. One exception was the "Moon Radar," with approximately three seconds time—allowing for unhurried manual switching.

Inherent delay limitations of electromechanical switching ruled it out for radar. T-R switches were developed as waveguide components, without moving parts, for wholly electronic operation. They provided an instantaneous shorting path to protect receiver sections when transmitter power was applied. After pulse transmission the receiver path was instantaneously restored. Switching was accomplished by ionization and deionization of a gas.

Frequency Range of Switches

These T-R's were expensive components in the form of mechanically exact "plumbing". They were designed to provide peak frequency response, suitable for particular radar systems but useless in broadband applications.

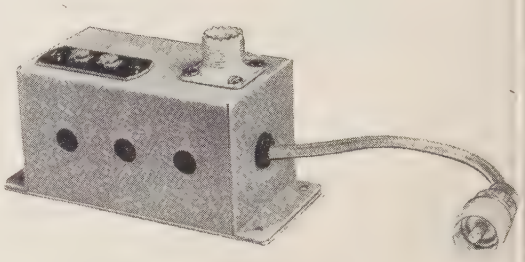
Positive switching action was of paramount importance to assure reception of reflected signals and to prevent burnout of delicate silicon crystal detectors. Crystals were supplied with lead shields as even unshielded spare units near powerful radar transmitters would be destroyed by induced RF.

Broad Band T-R's

Recently some of the engineering features of radar antenna switching have been adapted and combined with refinements to make practical, low-cost, automatic T-R switches for amateur and commercial use. These new T-R's, rated for continuous inputs up to 1 kw, are broad-band devices for use on the most-used amateur frequencies, 30 Mc & below. They require no tuning or band-switching.

The Transitron T-R Switch

Simplified design in the *Transitron** T-R switch eliminates use of inductance or variable capacity for long, reliable service. Difficulties encountered in the use of heavy duty antenna change-over relays are overcome. At rated



Transitron T-R switch. The tiny unit is mounted close to the transmitter. No power supply is necessary.

frequency range, receiver insertion loss is one S-Unit or less. Power absorbed during transmission is negligible with respect to transmitter outputs up to 1000 watts.

The *Transitron* T-R unit measures 2" x 2" x 3½", convenient for mounting on the transmitter cabinet. After mounting at the rear or side, connection is made to the transmitter output by a short length of coaxial cable. The antenna transmission line is connected to a coaxial receptacle. Screw-type terminals are provided for receiver antenna leads.

Operation of this switch is simple and foolproof. It consists of a thermister in series with a pair of germanium diodes across the r- transmission line. The receiver terminals connect across the diodes. When there is no RF power present in the line, the thermister has a very low resistance and the diodes have high resistance. When the transmitter is operating, the thermister resistance becomes very high depending on the amount of power present and the diodes conduct heavily and effectively become a short circuit leaving little or no r- voltage across the receiver antenna terminals.

*Transitron, Inc., 154 Spring Street, New York 12, N. Y.

A Practical T-R Switch

Cal Heisinger, W9TRG

Chief Engineer, Lakeshore Industries, Manitowoc, Wisconsin

Most of us, particularly the SSB brethren, ıave wished for a better system for quiet, ıutomatic switching of the transmitting an- ɔnna from transmitter to receiver. Herein is lescribed an automatic antenna switch and ɔreselector with positive receiver protection.

Development of the Circuit

The author has spent several years trying al- nost every circuit and unit that has come ılong for automatic antenna switching and all ɔf them up to now have always exhibited some

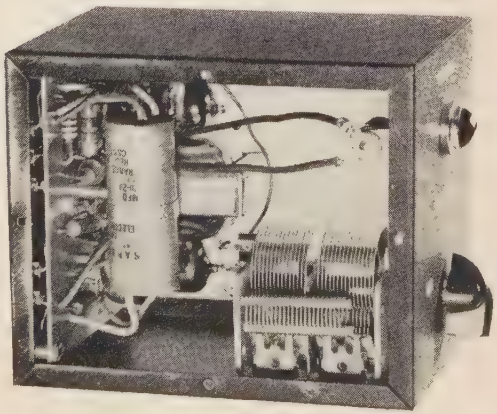
"Tenna Switch" T-R unit. Knob controls multiband tuning unit for maximum sensitivity and selectivity on "receive."

ıain disadvantage which limited their prac- cal use. The tubeless self-powered type gen- rally have produced too much insertion loss t the receiver (particularly on higher amateur requencies) to prove practical. The tube-type -R switches which have aroused some interest ı the last year were found to have limited ses because of poor spurious and image re- ction, along with poor gain on 20 meters and ɔove. And in locations near strong BC sta- tions, the third harmonic from these stations made operation on the low end of 80 meters almost impossible. These undesirable results seemed inherent in the broadband non-tuned circuits used.

The following circuit represents a compromise which has successfully corrected previous disadvantages of the above-mentioned types.

Operation

As shown in the accompanying circuit and photographs the electronic Tenna Switch utilizes two tubes. The triode section of a 6U8 tube is employed as a biasing cut-off stage which, when r-f power is applied to its cathode, developes a high bias voltage causing the tube to become essentially nonconductive. The second half of the 6U8 works as a receiving amplifier in the plate circuit of which has been inserted a multiband tank circuit allowing tuning of this stage for maximum gain and selectivity, 160 thru 10 meters, without bandswitching. The first half of the 12AU7 tube is employed as an impedance-matching stage to provide the required 300-ohm impedance matching required at the input of most receivers. The other half of the 12AU7 acts as a half wave rectifier for the power supply of the unit.



"Tenna Switch," left side view, showing placement of parts on printed circuit board. L2 is soldered directly to condenser terminals.

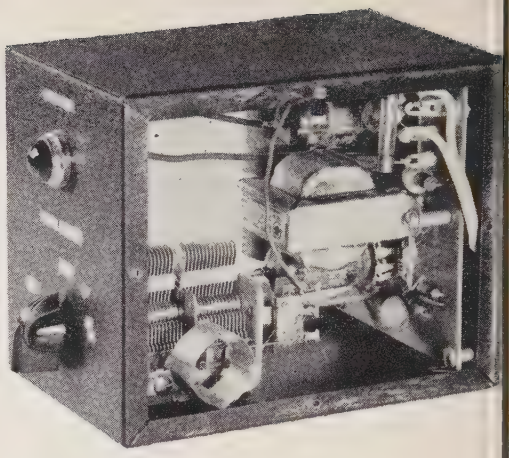
A special biasing arrangement using an IN34A crystal diode and associated components provides cut-off bias under transmit conditions to block grid 1 of the pentode and the grid of the cathode follower stage. This unique biasing arrangement makes it possible to have zero r-f voltage at the receiver terminals with a full 1-kw input to the electronic Tenna Switch.

Construction

The unit shown in the accompanying photos was bulit into a 6 x 5 x 4 *Bud* utility box and the complete circuit was laid out on a printed circuit board. Standard construction could be utilized if desired for this unit with only necessary consideration to stage circuit isolation. The multiband tank circuit is mounted on the bottom of the utility box and uses a common two-section variable broadcast type condenser. Coils *L1* and *L2* are made from *B&W miniductor* stock and mounted directly on the tuning condenser. The 6-watt 115 volt lamp is mounted on the front of the utility box so operation of the unit can be visualized.

Parts List

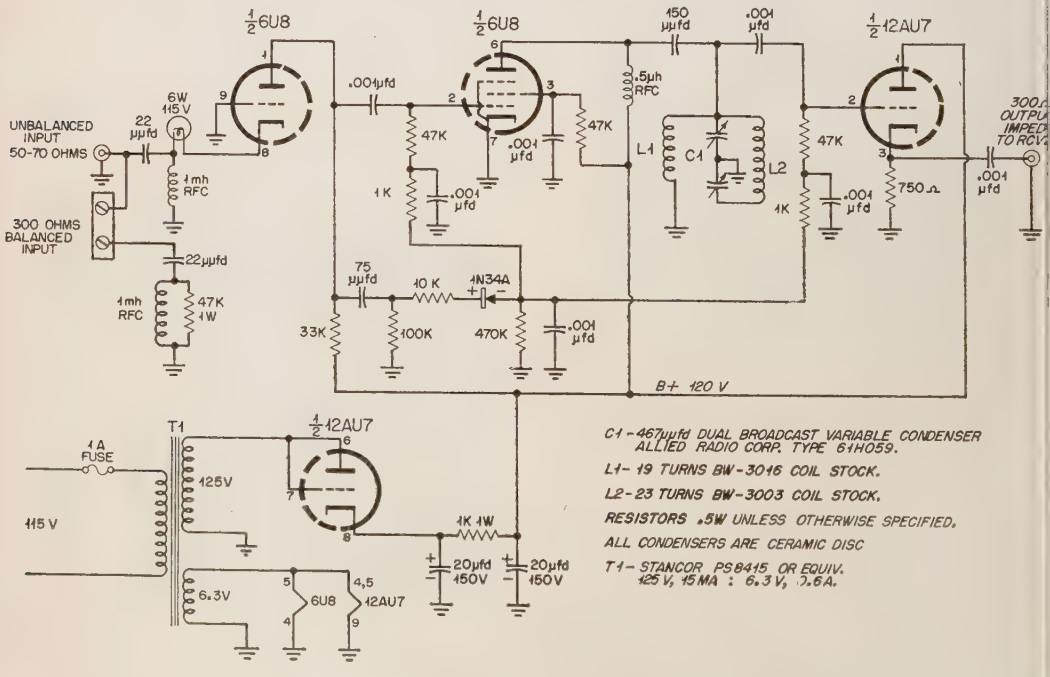
C1, 467 $\mu\mu$fd dual b.c. variable, Allied Radio Corp. type 61HO59
L1, 19 t. B&W 3016 coil stock
L2, 23 t. B&W 3003 coil stock
T1, Stancor PS8415 or equiv. 125v, 15 ma., 6.3v @ 0.6 a.
All resistors ½ watt unless otherwise marked.
All condensers ceramic disc type.



"Tenna Switch," right side view. L1 is soldered directly to condenser C1 terminals.

Operating Notes

Connection of the electronic Tenna Switch to your station equipment is simple and foolproof. The input of the electronic Tenna Switch is provided for use with unbalanced coaxial type lines of 50-72 ohm impedance or balanced lines of 300 ohm impedance. Higher impedance lines may be utilized with the unit providing it is hooked into a flat line with no serious standing waves or at a current point on the antenna feeders.



Complete schematic for the "Tenna Switch" T-R unit.

The input of the electronic Tenna Switch is simply paralleled across the antenna feeders of your antenna. If an antenna tuner is in use it is recommended that the electronic Tenna Switch be connected in the feed line between the transmitter and the antenna tuner. It is always desirable to connect a T-R switch into the lowest impedance line available. The output terminal should be connected through shielded coaxial line to the receiver antenna terminals.

Now tune in a station and peak the tuning control for maximum signal or S-meter reading. On most bands, if the tuning control is peaked for the mid portion of the band it will not require retuning over the entire band. On the higher frequency bands improved results may be obtained by repeaking the tuning control when shifting frequency from one end of the band to the other.

During transmitting, the indicator lamp will show some brilliance, depending on the power of the transmitter and the impedance of the antenna line into which the Tenna Switch is connected.

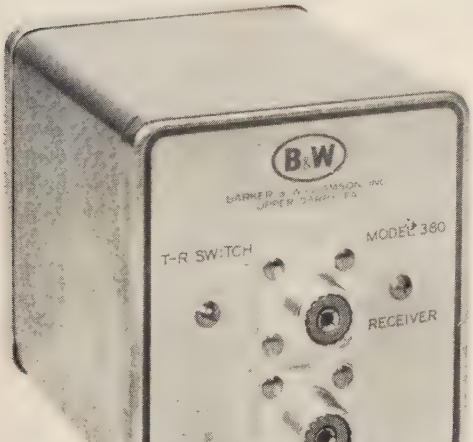
No Off-On switch was provided as operation showed no disadvantage to leaving the unit run continually.

One of the main advantages of this switch is that no receiver damage is possible if the transmitter is operated on a frequency *other* than that for which the Tenna Switch is tuned, as in older style T-R switches. Receiving gain provided will vary from about 12 db on 160 meters to approximately 1-2 db on 10 meters and with the addition of the tuned circuit sufficient gain is provided to compensate for loss thru signal absorption by the transmitter final tank circuit.

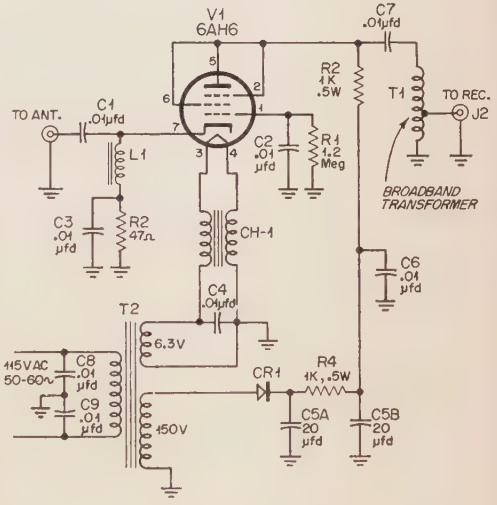
The B & W Model 380 T-R Switch

The B&W Model 380 T-R Switch is a broad-banded electronic switch which permits the use of a single antenna for transmitting and receiving without the use of a conventional coaxial type relay or switch. Throughout the Amateur Bands 80 thru 10 meters, Antenna changeover is automatic and instantaneous.

For use on break-in CW, AM phone, and voice-operated SSB. May be used with either 52 or 75 ohm coaxial line. Gain varying from



B & W Model 380 T-R switch.



6 db at 3.5 Mc to 0 db at 30 Mc is realized on reception, while the transmitting power loss is virtually unmeasurable. Will handle 1 kw. It is suggested that the 110-volt a-c line to the T-R Switch be operated in conjunction with your receiver a-c line, since failure to energize the unit permits almost no signal passage to the receiver. This is a "fail-safe" device. Therefore, should the unit not be energized or its vacuum tube fail, the transmitter will still be connected directly to the antenna, thus affording absolute protection to the transmitter, low pass filter, etc. Covered by Standard RETMA Warranty.

RTTY

reported by

Byron Kretzman, W2JTP

9620 160th Ave., Howard Beach 14, N. Y.

The mail bag has been quite full since this column first appeared in the August issue of *CQ*. This is quite remarkable because ham activities usually slack off during the summer. The old "regulars" have really been coming through with news. In addition, several letters have come from hams just getting started with radioteletype, or seriously thinking about it. It is very interesting to note that some of them already have machines. Remember when machines were so hard to get? That was only a few years ago, too.

My own radioteletype projects have been going full tilt in spite of the hot weather. (That cellar is cool, man, cool.) Finishing touches are being put on a really hot crystal-controlled 2-meter receiver. Double conversion with only one crystal, it uses cheap bc-replacement 10.7 Mc. and 455 kc. i-f transformers. It has about a 30 kilocycle bandwidth and a separate audio channel, with squelch, for monitoring purposes. As soon as I possibly can, I'll write it up as an article for *CQ*.

Speaking of crystals, many of us (W9TCJ and myself, for example) have found that they are very quickly and inexpensively obtained from the *International Crystal Mfg. Co.* in Oklahoma City, Oklahoma. These are plated crystals in small sealed holders and are normally supplied ground to .01% with a *total* circuit capacitance of 32 $\mu\mu$fd. Now, this is a very handy thing. Let me explain: most of the time we use a Pierce or a modified-Pierce oscillator circuit. The stray circuit capacitance across the crystal is due to the crystal socket itself, wiring, and tube interelectrode capacitances. This stray circuit capacitance might be in the order of 15 to 25 $\mu\mu$fd. Addition of a 15 or 25 $\mu\mu$fd. variable capacitor connected across the crystal socket will then permit the crystal oscillator to be moved right on the desired frequency by bringing up the total circuit capitance to 32 $\mu\mu$fd. If you write to this crystal company they will send you circuit diagrams of crystal oscillators designed to use these plated crystals.

AMATEUR RADIOTELETYPE CHANNELS

National, FSK (mark frequencies; space 850 cycles lower)
3620, 7140, 27200, 29160, 52600 kc.
National, AFSK (2125 cycles mark; 2975 cycles space)
27,200 147,960 kc. calling and autostart
144,138 kc. repeater & duplex
California, AFSK 147,850 kc. calling & working
Washington, D. C. AFSK 147,960 kc. calling & autostart
147,495 kc. working
Chicago, AFSK (FM) 147,700 kc. calling & working

Narrow Shift

According to George Cooke, the Hudson Division Director, the ARRL petitioned the FCC to let us use shift "under 900 cycles" July 6, 1955. Budlong, exploring the "feasibility" in Washington encountered no major objection. The proposal was based upon three points, "1—Experimentation, 2—Improvement of Technique, 3—Reduction of Interference."

Well, boys, the wheels are grinding. How many of you have equipment ready? While no standard narrow shift has been agreed upon, most of the preliminary on-the-bench experimenting has been done with a shift of 170 cycles. Bob Weitbrecht, W9TCJ, is completing his exciter project which will provide narrow shift. His terminal unit for narrow shift will probably be based upon a "sort of cycle counter system." Merrill Swan, W6AEE, has a discriminator-type of converter with Burnell toroids having a Q of over 100. Frank White, W3PYW, had 170 cycle gear ready back in May! Which one of you fellows is going to write that article for *CQ* on a 170 cycle TU?

John Williams, W2BFD, is working on a terminal unit set up for 60 cycle shift. This TU makes use of the 90 and 150 cycle filters

available from surplus glide-path receivers. Wayne is twisting his right arm and I'm twisting his left to get him to write it up for *CQ*.

Autostart

As described with the "New York Area" news, autostart sure came in handy when "Connie" blew in. Last month I briefly explained how it worked, using the W2BFD terminal unit. On the West Coast they have been using a slightly different system to turn on and off the machines. A complete description is contained in the Dec. 1952 issue of *CQ* beginning on page 32. For those of you RTTYers who don't have this issue, send 50 cents to *CQ*. Back copies are still available, and it's well worth while.

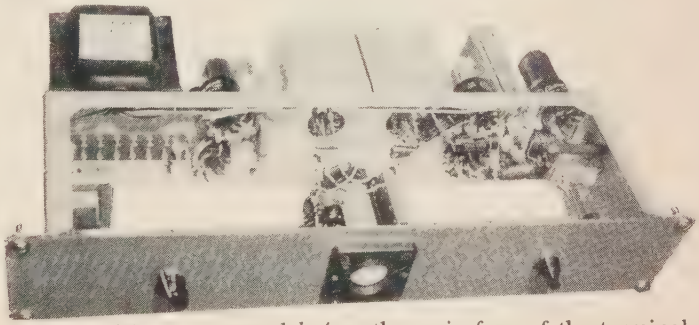
Whichever system is used, a clock unit is a valuable addition. With this unit you can set up, simply by flipping toggle switches, the particular times during the day that you want to make your machine ready for traffic. A clock panel which can be put together without too much trouble is diagrammed in *Fig. 1* and is shown in the accompanying photographs. Two clock motors are the heart of the unit. One revolves 1 revolution-per-day, and the other 1 revolution-per-hour. These were bought from *Herbach & Radman,* 1204 Arch St., Philadelphia 7, Pa. The 1 rpd clock drives a Mallory 13124L 24-position tap switch which selects the particular hour (through an on-off toggle switch) while the 1 rph clock operates a microswitch at the desired minute. Having lived for several years in the frugal W1-land of Vermont, I didn't install all 24 toggle switches, but drilled the holes and covered them with plug-buttons. The times left out were the wee hours of the morning (by threat of dangerous domestic consequences) and the working hours, where we have another machine on the channel anyway.

The 1 rpd clock drives a surplus right-angle gear mechanism to bring the main shaft parallel to the panel. This could have been another Millen #10012, which is used to drive the pointer knob on the 24-hour scale. (That nice 24-point dial comes with the switch (free), so I *had* to use it.) The two detent rollers in the 24-position tap switch should be removed and the pressure of each contact should be lightened to decrease the friction as much as possible. This is easily accomplished by removing the wafers and using a small screwdriver to open up every contact.

A collar with a round-head screw about 1-inch long is fitted to the shaft of the 1 rph clock. The microswitch has a roller arm which is operated by the screw-head each hour. Slotted holes are used to mount the microswitch so that the time-on can be adjusted from about 30 seconds to 3 minutes. Referring to *Fig. 1* it will be seen that the microswitch contacts are in series with the 24-position tap switch and toggle switch. Naturally the tap switch stays closed much longer so the time-on is determined by the microswitch. The lock-up and release mechanism, of course, is built into the terminal unit.

Also mounted on the shaft of the 1 rph clock is a 1-inch diameter plastic pill box, obtainable from the nearest drug store. This has a paper scale on the inside which is visible through the slotted window on the panel and indicates the number of minutes of the hour elapsed. If you want to get real fancy, you can illuminate the inside of the pill box with a pilot lamp. (I didn't.) The domed pilot lamp on the front panel houses an NE-51 neon lamp to indicate the closure of the clock circuit. The SET switch is used to synchronize the 1 rph clock with WWV or a time signal from a local broadcast station.

For safety sake a 1-ampere fuse protects everything. The TEST switch is a push-button switch used to check the lock-up and release timing in the TU. The clock unit should be connected *before* the main fuse of the terminal unit.



"Gates" terminal unit built by George Schee, W7ULL, of Spokane, Washington. It has a built-in Millen #90901 one-inch instrumentation oscilloscope. This uses the new 1CP1 Cossor one-inch cathode-ray tube.

Thanks go to Bud Kargoll, W2CB, for helping with some of the mechanical problems, and to Russ McCann, K2GFM, for the fine pictures of the unit.

RTTY FLASH

An RTTY Hamfest is to be held in Chicago October 3 in conjunction with the eleventh Annual National Electronics Conference. Contact Joel Juel W9BGC, 120 S. Lavergne Ave., North Lake, Illinois for details. Door prize may be a Model 28.

Across The Nation

Roy Weise, W2TKO, finally got 2-meter activity started in the Buffalo area. W2ZOC/K2EPV in Lockport is on with a Model 12, and W2ALR is on with a 21A strip printer and 11A keyboard. Roy says, "From the interest shown there would be a lot more if equipment were more readily available." There *is* equipment available, fellows. Contact the *ARTS*, 38-06 61st Street, Woodside 77, N.Y. for a list of available equipment and/or see the #37 *ARTS Bulletin*. W2TKO put up his new 55 foot tower which he will use as a vertical for 80 and 40. The v-h-f arrays will be on top. By the way, did you see the FSK keying system of W2TKO in the July issue of the *RTTY Bulletin*?

Denver activity is picking up, according to WØBTV. WØJRQ has a new set-up with a Model 26, a Gates terminal unit, a Panadapter, a 32V2 transmitter and an NC-183 receiver. Mace says that, ". . . two or three others (are) about ready to go in Denver."

Tommy Walker, W5QZJ, in Austin, Texas, has an SCR-522, a Viking, an HRO, and Model 12 machine, but needs a little help to get on the air. Anybody on in Austin that would like to give Tommy some help? If you get to Fort Worth, Tommy, look up W5HZF.

July 23rd an RTTY meeting was held at the home of Merrill Swan, W6AEE. About fifty of the local gang attended. On the bill of fare was barbecued hamburgers, talks, and a drawing for a 1A tape head. One talk by W6CMQ was on the telephone company's electronic regenerative repeater. W6CG described the modification of the Model 26 for tape TD use with the 1A head. All of this equipment was brought to Merrill's house for the occasion.

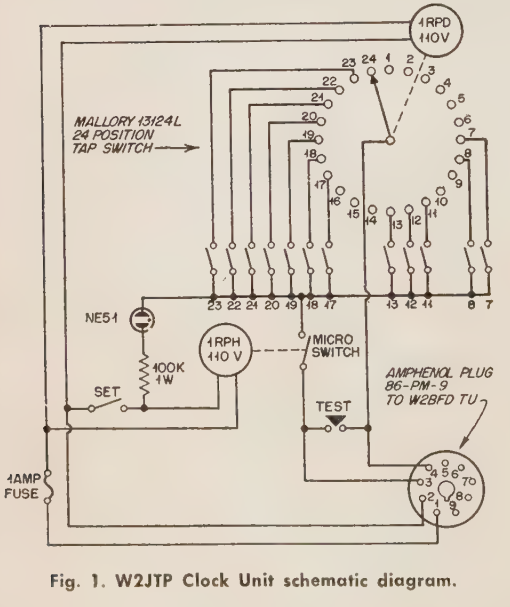


Fig. 1. W2JTP Clock Unit schematic diagram.

The Lowery electric organ was moved out o the back porch and, "W6NAT really ga out." Group singing, too. It happened to Merrill's birthday, so a beautiful Kaywood meerschaum pipe showed up with a card sign by the whole gang.

New stations on are: W6AKG/KL7 at Fc Richardson with a BC-610, TT-4G and a Mod 100 Kleinschmidt; W2JOP/KL7 at Anchorag W7CSC Portland; K6GB West Sacrament K7FNG at a National Guard Camp in Idah and W4VWM in Savannah.

W6AEE also reports 2-meters active in Ch cago, Detroit, and Seattle. Who, man, wh Let's hear from some of you fellows in tho cities.

Henry Galbraith, W9RDJ, in Evansville r ports on activity in southern Indiana. He h a Model 12 along with a tape distributor, ta transmitter and perforator. The converter of the W2PAT type and he has a ". . . 52 just itching for me to finish my shack at t new QTH and get on." Also in Evansville Phil Hatfield, W9GFS. Phil also has a Mod 12 and a W2PAT converter. He has been i but should be up and around by this tim W9RDJ would like to see more informatic on converters and frequency shift in *CQ*.

Bob Weitbrecht, W9TCJ, is finishing up h new threeband heterodyne exciter which us 9.0, 12.5 and 19.5 Mc. crystals with a tunab Clapp oscillator around 5 Mc. He extracts t difference for operation on 80, 40, and 20. B has completed a remote control system whic can be worked over a wire pair or radio. 42 Mc. is being tried, but there are still son problems with the APS-13 gear.

New York Area

Autostart got a nice work-out when that b bag of wind, "Connie", hit New York. W2PR works in the top of a big skyscraper in th heart of the city and operates from there c 2-meters as W2PRB/2; "portable", with Model 15, full tape equipment, and a 6-fo rack containing the TU, 522, and pow supplies. (!) The home QTH is about 2 miles out on Long Island, so W2PRB was i terested in highway conditions as he wa working late (with Connie). At 7 p.m. h put the message out requesting information an copied weather reports until midnight, su plied by the fellows out on the island who ha driven through the storm. By the time W2PR left for home, he knew just what routes t avoid.

6-meters is about to get a bit of radiotel type operation around New York City as th result of the availability of used surplus polic FM equipment. Both mobile and base-static equipment is available through ARTS, and th receivers are fantastically sensitive. Perha this is the answer to some of the long-ha hops necessary in this area, and for that ext

"working" channel so often needed. Getting set for 6-meters are: W2AKE, W2BFD, W2EBZ, W2MYL, W2NSD (who dat?), W2PRB, and W2ZRB. Anybody else using 6-meters for radioteletype?

Bob Straub, W2PBG, in Bayside should be on 2-meters by the time this appears. Bob kept up his 80 and 40-meter operation during the summer, but slacked off on construction projects. (I don't think he has a cool cellar like W2JTP.) That 2-meter rig with the pair of 6146 tubes in the final is almost finished and should make a sizable dent in the background noise on the channel.

Andy Stavros, W2AKE, took a much needed vacation from his stringent duties as Chairman of NY-ARTS and Circulation Manager of the *ARTS Bulletin* and took a trip to Europe. Andy's 425 cycle electronically-driven fork standard has been extremely useful to the local boys, including myself, in setting up our AFSK oscillators, and his generosity in making it available is much to be commended. I hope to persuade him to write it up for *CQ*. It's an extremely useful gadget around an RTTY ham shack since the standard AFSK frequencies of 2125 and 2975 cycles are multiples of 425.

Comments

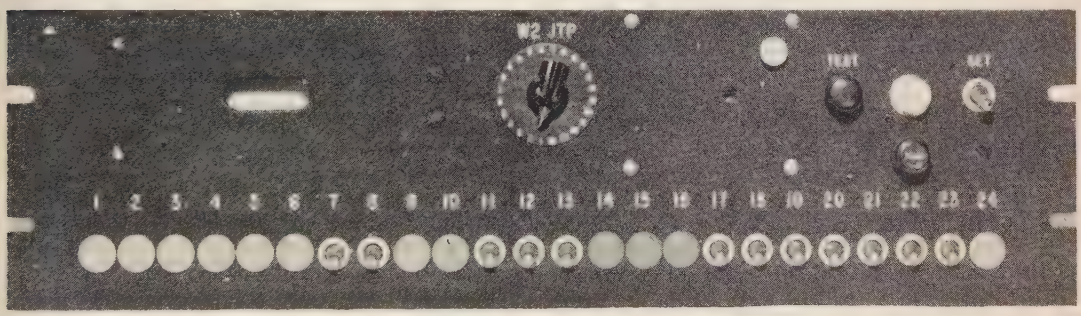
The mail bag shows several requests for more technical information on radioteletype. This we hope to supply in the near future, both as separate articles and as small bits to go with the column, such as the clock unit this month. The advantage of the separate article, of course, is that you get paid for writing it. Need I say more?

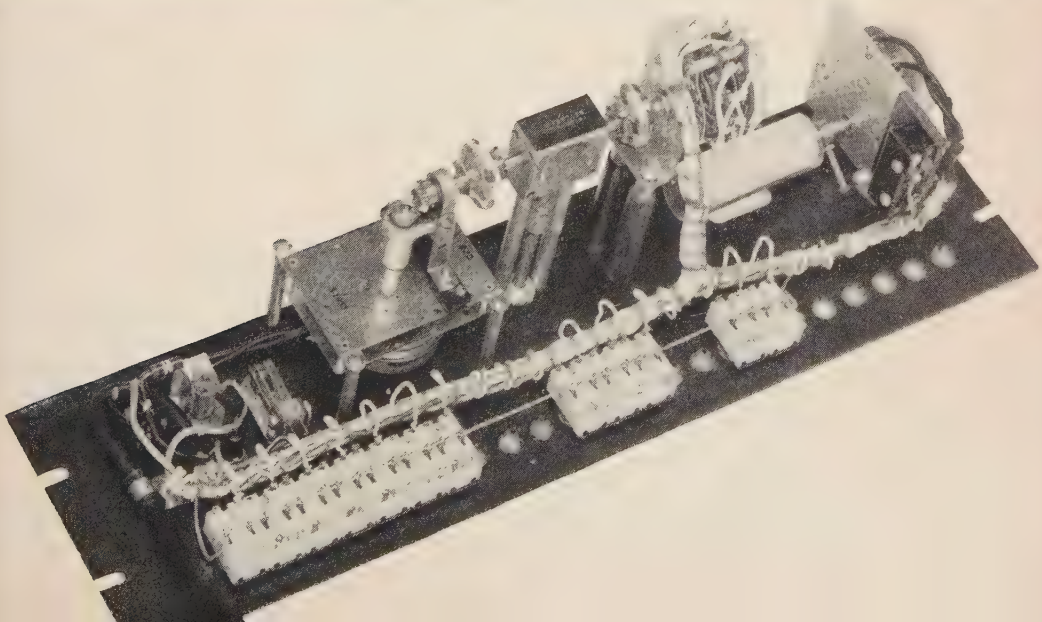
In the interest of co-operation between the ARRL and all RTTYers, as a group, it has been suggested that each of you check and see if *your* Division Director gets *CQ* and reads the *RTTY Column*, and that you see to it that he gets the *ARTS Bulletin* and the *RTTY Bulletin*. The better acquainted they are with our activity the better they will be able to serve us when the need arises.

While on the subject of the ARRL, I am reminded that this question has been asked many times: "Why doesn't W1AW put out ARRL Official Broadcast Bulletins on tape FSK radioteletype?" I'll try and have an answer to that one in next month's *RTTY Column*.

Thanks again for your letters. Keep 'em coming to W2JTP, 9620 160th Ave., Howard Beach 14, N.Y.

Panel-mounting Clock Unit in W2JTP RTTY installation.





Most certificated ham W2QHH's shack sports the handsome CQ World Globe.

CQ WORLD GLOBE

Special Subscription Offer

Now for the first time you can afford to get a large world globe for your ham shack. Every DX man has wanted and needed such a globe, but few have been able to afford more than the very smallest on the market due to the high cost of such globes. When you get your eyes unglued from the new *NC-300* on this month's cover, you'll notice the new *CQ* World Globe sitting proudly atop the Viking Ranger.

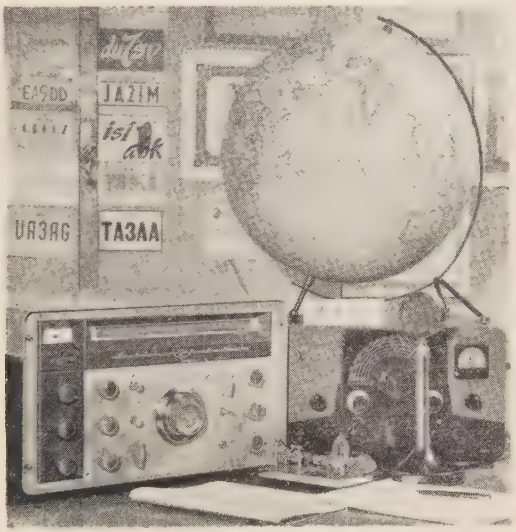
CQ has made a special deal with one of the largest map makers in order to bring you these 18″ globes for only about one tenth the price you might have to pay for a globe this size. The globes are available to you, together with a one year subscription (or extension of your present subscription) to *CQ* for only $19.95. Fill in the coupon below and send a check or money order for the full amount, and you will receive your globe by prepaid parcel post.

The *CQ* World Globe is protected by a special plastic coating which makes it possible to wash the globe should it become dirty, or

ou can write on it with colored china-marking pencils and then wipe off the marks hen you want to change them. The globe comes complete with a stand and otates freely on its axis when you want to spin it around. All boundaries are p-to-date and the colors are beautiful. The printing has been done with precision o that it can easily be read. Even the smallest islands are shown. For nstance, Gough Island (ZD9AD) shows clearly in the South Atlantic.

This offer is limited so take advantage of us while the opportunity presents itself nd get one of these beautiful World Globes. Thanksgiving is only a few weeks way . . . give one to the XYL for Thanksgiving. An ideal present—let her now you still care. And, if you have any kids, they will really love the Globe and you get an extra year of *CQ* in the bargain).

The editors of *CQ* are proud to offer the attractive *CQ* World Globe as a *seful* adornment for the hamshack, living room or children's playroom.



Every DX man needs a good globe for his shack.

CQ-10

CQ Magazine
67 W. 44th St.
N. Y. 36, N. Y.

Gentlemen: Please ship me (prepaid) the *CQ World Globe,* plus a one year's ☐ new ☐ renewal subscription to *CQ*. I enclose my ☐ check ☐ money order for $19.95.

Name ..... **Call**

Street Address

City ..... **Zone** ..... **State**

Results: 1954 World Wide DX Contest

The 1954 World-Wide DX Contest, like many similar operating events, was accompanied by uncertain propagation conditions. During the CW weekend, they ranged from very poor to fair; during the phone weekend, they were almost without exception poor. As a result, scores and activity reflect in a direct ratio these conditions.

The World-Wide DX Contest has been operated for the past several years by the International DX Club, a group of amateurs who banded together primarily to perpetuate the operating activity. The 1955 event will again be taken over by *CQ* magazine and run as a *CQ*-sponsored activity. It may be expected, therefore, that publication of results and dissemination of awards will be quicker. However, in reviewing the thousands of logs that were received for the 1954 Contest, full credit should be given to the small handful of IDXC members who untirelessly devoted their time and effort to preparing this resume.

All logs were checked and scored by the Contest Committee of the Potomac Valley Amateur Radio Club. This in itself was a tremendous task, since a very small percentage of the logs received were properly scored. It is earnestly hoped that participants in future events will relieve the committee of this chore by using the standard reporting forms recommended in the October writeup.

Tabulating the scored logs, and in charge of the multitude of details in setting up the various winning categories, was W9VW, Hal Brooks, a well-known DX man whose activities have been greatly curtailed by his attention to the World-Wide DX Contest. W9VW was assisted by W9IOP.

The World-Wide DX Contest has evolved as an outstanding event because it has permitted the foreign amateur to exchange contest co tacts with other DX hams, rather than limiti them exclusively to contacts with the Unit States and Canada. It is an event not meant replace the well-known ARRL DX Conte but rather to provide a supplementary activ of an entirely different nature. The huge forei participation is a strong indication that it is operating activity looked forward to by D men everywhere. With greater publicity a wider dissemination of the rules, it is expect that this event will continue to increase popularity, attracting more new countries a rare prefixes and foreign amateurs who mig otherwise have stayed out of any contest a deprived Americans of an opportunity to wo them.

In order to permit complete details of t Contest to be published, the writeup and phot graphs have been kept to an absolute minimu Tabular boxes for the different winning ca gories give you a quick appraisal of who c best in each area. Of particular significance the domination of this event by the 4X4 a ateurs located in strategically placed Israel. F a number of years now, Israeli amateurs ha dominated the high scores. Ideally located take advantage of openings on all bands, th have combined their geographic advantage wi superb operating performances.

World high is **4X4DX,** Sam Monastirsky cated at the Lydda Airport. Operating the f forty-eight hours of the CW weekend, Sam us a 125-watt VFO-controlled transmitter. On and 40 he employed a half-wave dipole; on a ZL special; on 15 a folded dipole and ground plane, and on 10 a 3-element rotar The receiver was an SX28 with a preselect converter. Operation was on all bands from through 10. Eight hundred and twenty-ni QSO's with a multiplier of 185 added up the corrected score of 597,065.

Second world high and an outstanding sco in its own right is that of **4X4RE.** Egon us a 250-watt transmitter, an SX28, HRO HQ129X and various half-wave antennas. Ov 673 contacts with a multiplier of 223 add up to this outstanding performance.

In preparing a summary of a contest whi created as much foreign activity as did t World-Wide DX Contest, it is difficult not give credit to many of the outstanding scor that made it a good event for the American For example: **SP3AN,** with 134,000 poin Wes lost almost a fourth of the time with tran mitter bugs and promises bigger and bett things next contest. No contest would be co plete, of course, without the big score fro **OK1MB.** In case you are wondering what cas

World High Phone Scores
Single Op

1.	CN8MM	276,488
2.	4X4DK	275,110
3.	PY2CK	222,326
4.	VQ4RF	207,908
5.	W1ATE	176,881
6.	OQØDZ	163,056
7.	W6YY	139,500
8.	PY2AHS	127,865
9.	DL1AU	121,636
10.	G3AWZ	117,900

out that signal, it is a 1,256-foot long wire, 100 feet up in the air with a 628-foot counterpoise 50 feet up.

OZ7BG with 113,000 points promises greater activity than ever next time when he gets his beams up. **G6PD** with 140,000 points sparks what everybody hopes is a resurgence of DX Contest activity from the Empire stations. **PAØUN,** 140,000 points and a long-time contest standby. **DL1AU,** a top winner on both phone and CW, and one of the only amateurs to turn in the trick in the 1954 Contest. Helmut uses a ganged one-knobbed, tuned bandswitching transmitter, running 150 watts. A double conversion, crystal controlled homemade super completes the station. Antennas are beams and long wires.

FA8DA with a consistently fine signal turned in 177,000 points. **4X4DE** with 371,000 points would have been high score in virtually any country except Israel. It is still an outstanding score. **DU7SV** with 130,968 points, well represented the Philippines where activity, unfortunately, is at a low ebb. **ZL1BY** with 172,312 points and **KA6IJ** were so close to each other for top honors in Oceania that mention certainly should be made of the scores. **PJ2AA** gave a lot of Europeans their first crack at this country and ended up with 62,000 points. **VQ4RF** with an outstanding signal throughout almost the entire contest ended up with 157,312 points. **OQ5GU,** another standout signal with 151,900 points, and of course, **EA9DF** with 149,490 points who keeps a rare country well represented on the air. The same thing holds true for **EA9AP** with 138,575 points who has made Spanish Morocco a surefire contact for every DX man. **HZ1HZ** with 124,389 points kept this rare country on the air throughout most of the Contest. With the Japanese amateurs getting more active all the time, **JA3AF** was high score this year with 61,054 points. High from Australia, none other than well-known DX man **VK2GW,** and what contest would be complete without an outstanding score from **CE3AG**? Luis, presently touring in the United States, will probably not be home in time for the 1955 Contest, a signal that will be missed by everyone. Lebanon, represented by **OD5LX** with 144,250 points, gave many a DXer a new country. **KP4JE** with 127,942 points provided Puerto Rico for 543 DX men. **YV5AB,** 112,222 points ensured Venezuela for many contestants.

Among the Americans there were none surprised to see **W4KFC; W4HQN** with Len Chertok, **W3GRF,** operating; **W8JIN, W2WZ** and **W6ITA,** all out on top. All of the top Americans worked all bands, 80 through 10, and 4KFC and 8JIN and 4HQN also worked 160. Each ran a kilowatt and all of them used elaborate receiving and transmitting setups. Between these top five American scores, you will find a houseful of Collins and National receivers, V beams, 3-element rotaries, ground planes, and needless to say, sympathetic and devoted families.

World High CW Scores
Single Op

1.	4X4DX	597,065
2.	4X4RE	479,896
3.	CE3AG	402,210
4.	4X4DE	371,346
5.	DL1AU	310,128
6.	W4KFC	308,812
7.	W2WZ	302,175
8.	W8JIN	301,096
9.	W4HQN	298,100
10.	OK1MB	268,191

In the multiple-operator CW group, one battle is particularly noteworthy, that of **W6AM** and **W6YMD.** W6YMD with 193,584 points just nosed out W6AM with 191,364 points, a real battle of the giants. **W9VW** teamed up with **W9IOP** for 88,000 points, but it wasn't even half good enough to beat **W9AVJ** and their group operating from the old location of W9LM. Perhaps they didn't want to make too much work for themselves in tabulating these results.

Phone

The phone men, facing generally poor conditions, worked extremely hard for their big scores. The two Americans who were among the top ten world high scorers deserve special accolades, because with phone band subdivisions as they are, the DX stations have every possible advantage.

The race for world high between **CN8MM** and **4X4BK** is most unusual in that only 1,500 points separated the two tremendous scores. In submitting his score, CN8MM gave little information on the station, but the log itself is

Single Operator Phone Winners

North America	
W1ATE	176,881
South America	
PY2CK	222,326
Europe	
DL1AU	121,636
Oceania	
ZL1BY	60,480
Africa	
CN8MM	276,488
Asia	
4X4DK	275,110

Leading W Single Op Scores By District

CW	
W1ODW	55,955
W2WZ	302,175
W3JTK	134,232
W4KFC	308,812
W5ZD	48,910
W6ITA	215,058
W7PQE	63,290
W8JIN	301,096
W9HUZ	77,408
WØDAE	75,069
PHONE	
W1ATE	176,881
W2SKE	111,860
W3VKD	43,250
W4OM	36,188
W5LFG	10,703
W6YY	139,500
W7QDI	2,482
W8JIN	45,640
W9NDA	33,744
WØGEK	2,412

really all the evidence that is required as to both the opertaor's proficiency and his equipment's performance. Perhaps, on phone more so than on CW, performance on the low frequency bands by DX stations is amazing. Prefixes rarely, if ever, heard in the states are commonplace with excellent reports on the low frequency bands. 4X4BK did not accompany his log with the details on station description, either, and again leaves the log as testimony to his performance.

PY2CK third world high and not far behind the two leaders is, of course, a well-known contest DX man. Jayme used a kilowatt on 7, 14, 21, and 28 megacycles, a Collins 75A3, three elements on 20 meters, two elements on 15 meters, four elements on 10 meters, and a ground plane on 40. With activity down in South America this year, he was a welcome multiplier for many contestants.

OK1MB, high scorer for Czechoslovakia.

The fine performance of **VQ4RF** is notable for another reason that he is an outstanding CW operator and has demonstrated his versatility equally on phone. **OQØDZ** in Ruanda-Urndi set many a DX man's heart pounding, using a 100-watt transmitter, a 4-element rotary. **W8JK** on 10, 15 and 20 meters, and a T2FD on 40 with a 75A3 kept his frequency humming at all times. Unfortunately, he will be in Europe during the 1955 Contest and not participating. Operating from a gasoline generator, **OQØDZ** deserves considerable credit for his performance.

PY2AHS, DL1AU and **G3AWZ** all closely grouped together for 8th, 9th and 10th world high phone scores are an indication that greater participation in their particular countries would surely have added up to some big scores. As mentioned elsewhere, DL1AU was 5th world high on CW and, thus, is the only participant to lead his continent on both phone and CW.

A word about **ZL1BY** whose 60,480 points made him a leader for his part of the world. So many of us have come to think of him as a CW man only that it's refreshing to see him turn in this very respectable A3 score.

As for the sturdy band of Americans with outstanding scores on phone, **W1ATE** is an old and respected contestant, generally at the top. Extremely poor conditions, particularly on 28 and 21 megacycles, greatly hampered performance on these bands. Using essentially the same equipment as previously, three separate 1-kilowatt finals with push-pull 250TH's, driven by a 32V1, and a 75A3 receiver, Chad's greatest asset outside of his operating ability, remains the outstanding antenna setup. Because it is hoped to treat all of the outstanding American contestants in greater detail in a separate article, space will not be devoted to a description in this writeup.

On the West Coast, **John Knight** has earned himself a reputation that would be tarnished if he did less than lead the pack on phone. On the West Coast low frequency conditions were extremely poor, but fair on 10, 15 and 20. With separate kilowatts on each band, driven by a 32V3, 75A2 receiver, HRO60, with DB23 preselectors, John also has an antenna array that is no less impressive than W1ATE. Of particular interest is the vertical top-loaded antennas used on 160, 80 and 40, with rotaries on all other bands.

W2SKE, Bill Leonard, who only recently has become greatly interested in contest work, was operating from the location of **W2HJR.** The transmitter was a KW1 with 75A3 receiver, and antennas again in the category of a ham's dream. Here, too, nothing less than a com-

plete description would satisfy DX-minded hams and such a description will be forthcoming in a later issue.

Following the top three American phone scores, there were some pretty big gaps, but credit nevertheless goes to leaders in all districts. Of note is the score of **W3LOE,** 47,838 points. Bob, a long time CW participant, and occasionally on phone, indicates that time and locations permitting he is still a factor to be reckoned with. **W3VKD** with **W3WPY** operating for 43,250 points is a comparatively new call to the contest ranks. **W4OM** and **W8JIN,** as well as **W9NDA,** are all well known to the DX ranks, and in each instance have earned a solid reputation on CW, indicating that they are well-rounded contest men.

The multiple-operator phone men were completely dominated by five scores. Leading the competition in the United States was perennial contest champion **W6AM,** operating with the assistance of **W6KPC, W6KSF,** and **W6YMD.** No change in the operating setup, which continues to be one of the outstanding in the United States. Don's equipment will also be described in greater detail in the future article.

W9AVJ operated by **W9GVZ, W9NAM,** and **W9PKW** with 28,784 points proves that it is possible to do something from the Mid-West in an international competition. W9AVJ's station will also be covered in subsequent write-ups.

An outstanding score from Europe is that of **F7BM** with 208,725 points, operated by **K2JCS** and **W4YDF.** F7BM used only a Viking 1 running 50 watts input, a Collins 51J, an RCA AR88 receiver, coupled to a 3-element rotary on 15 and 20, and folded dipoles on 40 and 80 provided the radiating systems. With conditions comparatively poor, this is a truly outstanding performance.

From Ecuador, two top-notch scores. One from **HC2JR,** 193,734 points with operation principally confined to 20 and 15 meters. The transmitter was a Collins 32V3, receiver a 75A3, and 3-element beams. The second op was **HC8GI.** In the same country Will Boyd, **HC1MB,** turned in a score of 141,700 points. A poor European opening cut down multipliers and contacts pretty badly. Operators at HC1MB were **HC1CB, HC1ET,** and of course, Will himself. 32V2's driving a 250TH was used on 20, a BC610 on 20 and 40, 32V2 on 10 and 15, and a B&W 5100 on 10 and 15. 75A3 and NC183D receivers, both with RME DB23's ahead of them, 2-element rotaries on 15 and 20, 3-element on 10, 40-meter vertical grouping ground plane, and a 40-meter doublet comprise the station equipment. A real ham's paradise with a prefix that's much in demand for a QSO, backed up by solid operating, HC2JR and HC1MB show what two outstanding stations can do to put a single country on the map.

Because space does not permit a detailed description of all of the outstanding stations, subsequent issues of *CQ* will carry special articles devoted to detailed descriptions of the equipment and personalities of the winning American stations. If this feature proves popular, at a later date it will be extended to include the outstanding foreign stations, who they are, what they do for a living, what their equipment looks like.

The success of any contest is based solely upon the interest shown by the participants and DX men everywhere who find the International DX Contest a stimulating activity should be certain to pass on their comments to the Contest Committee and encourage participation by foreign stations. Good luck in future events.

A complete listing of the scores of all stations that entered logs for the contest will be found on pages 88 and following.

Multiple Operator CW Winners

North America	
W4KVX	214,200
South America	
LU8ABL	75,552
Europe	
I1BDV	136,160

Multiple Operator Phone Winners

North America	
W6AM	98,100
South America	
HC2JR	193,734
Europe	
F7BM	208,725
Oceania	
KR6OO	12,364

Single Operator CW Winners

North America	
W4KFC	308,812
South America	
CE3AG	402,210
Europe	
DL1AU	310,128
Oceania	
KH6IJ	178,932
Africa	
FA8DA	177,828
Asia	
4X4DX	597,065

VHF

Reported by Sam Harris, W1FZJ

P.O. Box 2502, Medfield, Mass.

Left to right. Two-meter men all. W9BBU, W9WOK, W9TKL, W1FZJ, W9MMG, and W9GGH.

The antenna at W1FZJ

A fellow always wonders, when operating on a VHF band, whether his work is measuring up to what people are doing in other parts of the country. Of particular interest is the "miles per contact" made in a normal month's operating. Should you be working stations farther away? Or are you operating at the maximum practical reliable limit?

MPC

On the basis of the number of inquiries I have had on this subject, I am starting the ball rolling with a resume of the miles per contact made by my station in the period from July 15th to August 15th. In this period (not counting portable operation) I made 151 contacts. Total mileage for these contacts added up to 32,015 miles for an average of approximately 212 miles per contact. Longest haul was 1100 miles to W4HHK in Collierville, Tennessee. Shortest distance was W1OOP, 6 miles. Longest nightly contact was VE3DIR in Toronto, Canada, 425 miles. (12 contacts in this period.)

I should point out that in 20 hours of operating portable from Pack Manadnock, New Hampshire, we beat this both in number of contacts and miles per contact (152 contacts, 35,350 miles). Who's next?

Visits

Had a nice visit with John and Terry (W9WOK and XYL) last month. In addition to showing me how they work DX in the midwest, John took me on a tour of Illinois, showed me how his new house is coming, let me in on a hamfest at Blackie's QTH and drove me to the airport to catch my plane for the water-bound Rhododendrum Swamps.

First evening there the W9WOK's took me to see Dick (W9EQC) and XYL, Esther. Dick was busy keeping 220 Mc skeds with W8SVI. I got a picture of Dick at the operating position but my attempt to get a flash photo of his side by side 220-144-Mc beam didn't come out well enough to print. Needless to say, however, it is a real Kluge and maybe Dick will send us a good photo of it. Two-meter operation from W9EQC is on 144.100 Mc. One-and-a-quarter skeds are kept on 220.185 Mc with W8SVI at 2215 CDST. 220 Mc boys in the east might bend an ear westward at this time. Who knows?

Next day we trecked south to the land of long beards and big beams. First stop, McLean, Illinois, at the home of W9EHX.

Red was busy beguiling a customer into buying a one-eyed monster when we arrived and we took the opportunity to photograph his beam and inspect his new secret weapon which while lying flat on its back on the ground showed potential evidence of making a big signal one of these days. (Before winter I hope, Red.) Two-meter operation from McLean, Illinois is on 144.040. Red sports a pair of HK24G's and a wide-spaced thirty-two element phased array. He's listening with 417A's and doesn't miss much.

From McLean we slipped over to Armington, Illinois, and caught Peck (W9BPV) in the act of overhauling his two-meter exciter. Got a good picture of Peck but the antenna photo showed lots of blackbirds and no elements. Peck's got it *way* up thar in the air. Running one hundred and fifty watts on 144.180, in case you want to listen for him.

We got back to John's house in time to talk to W8KAY of Akron, Ohio, and then to bed.

Next day we're off to Blackie's house complete wtih watermelon and Budweiser. Here many good men (complete with XYL's) were assembled. From my point of view at least a gathering of such sterling two-meter men as Jack (W9TKL), Howard (W9GGH), Tony (W9MMG), Blackie (W9BBU) and John (W9WOK) make a trip to Illinois worthwhile. Blackie and Irene as usual at their annual get-together entertained us royally and fed us until we cried "Uncle." Sorry I had to leave early but I had to catch a plane. One thing I won't forget about Illinois. It's *hot* out there.

S.S.W. Contest
Scores for July

Station	States	Contacts	Final Score
W1ZGO	9	204	6,936
W1AQE	8	152	6,384
W1RFU	9	44	1,496
W1PYM	6	50	1,400
WN1DDN	2	20	400
W2WFB	6	568	15,904
K2APS	10	314	11,304
KN2LYI	3	88	1,746
KN2KET	3	34	748
W2AZL	14	138	5,520
K2GLS	2	66	1,320
W3TDF	13	242	9,196
W4HJQ	7	170	5,100
W4WNH	6	152	4,256
W4VUO	3	58	1,276
W5POG	3	136	2,992
W6LBO	1	210	2,100
W7QDJ	1	100	1,000
W8LOF	9	310	10,540
W8MUE	10	256	9,216
W8LAH	5	182	4,732
W8HOH	4	100	2,400
W9KLD	5	244	6,344
WN9NXI	5	206	5,356
W9DSP	6	130	3,640
W4WNH/9	1	4	40
WØRSP	6	176	3,828
WØBCB	4	92	2,208
WØOPQ	9	70	1,400
VE3DIR	10	318	11,448

Dick Lybarger (W9EQC), Aurora, Illinois ready and waiting.

Meteors

I presume that the astronomer who first calculated the recurrence of the Perseides meteor shower didn't have the two-meter boys in mind. Nevertheless, his sterling efforts have paid off for W4HHK. Paul added two new states to his total by working W1FZJ in Massachusetts and W7VMP in Arizona. This last contact was real DX being in the over-1300-mile class.

In addition to working Paul in Tennessee, I also exchanged new states with John (W9WOK) at Bensonville, Illinois. And I might have had Kentucky if I had been aware of Shelby (W4WNH)'s frequency (144.128).

Shelby says: "How about some exact frequencies? This morning I tuned around 144.3 (as given in *CQ*) without hearing the first ping, until finally at 0545 you block my receiver at about 144.25."

I'm sorry Shelby, but I tried to move my crystal up to the advertised frequency and only succeeded in lowering it. (They must make crystals different nowadays.) Anyhow, where you heard me is where I'll be the next time.

Expeditions

Off to New Hampshire and Pack Manadnock. Only one day late and with only a twelve element beam and eight hundred watts on two meters. No equipment for 220 Mc or 420 Mc. My apologies to the gang who hoped in vain. I hope we made up for it in the last VHF contest.

In any event it was midnight Saturday before we made our first contact from *the Pack*. Sure want to thank all the fellows who stuck

Left to Right: John (W9WOK), XYL Terry, and Red (W9EHX) (Note secret weapon in lower right hand corner).

around long enough to give us a contact. Paul (W1PYM) was on hand and managed to talk his way through over a hundred contacts before he left Sunday evening. Yours truly added another forty or so for a grand total of 152 contacts in eighteen ARRL sections. Total operating time was about twenty hours. Best DX was W8SRW in Hubbard, Ohio. Best heard report was from W9FVI, Nashville, Indiana.

Sorry I missed you, Harty.

Bob Kurth (W5IRP) operating portable the hard way.

Schedules

VE3DIR	144.2	to	W1FZJ	144.25
2200 EDST				
W9WOK	144.126	to	W1FZJ	144.25
2215 EDST (John calls for five minutes.)				
W8KAY	144.301	to	W1FZJ	144.25
2230 EDST				
W8KAY	144.301	to	W1REZ	144.25
2230 EDST				
W8KAY	144.301	to	W1RJA	144.25
2230 EDST				
W2ORI	144.020	to	W9WOK	144.126
2225 EDST				
W2ORI	144.020	to	W1FZJ	144.25
			W1REZ	144.25
			W1RJA	144.25
2245 EDST				
W9EQC	220.128	to	W8SVI	220.100
2215 CDST				

Looking east at 2200 EDST

WØETJ	144.0012	Friday, Saturday, Sunday
W9QXP	144.083	Nightly
W9EHX	144.040	Nightly
W9EQC	144.100	Nightly

Pay-off Department

Tony's schedules with Al (W1KCS) finally paid off. Tony now has all the New England States under his belt and is heading west. Les (VE3AIB) and Iris (VE3DER) brought home the bacon from New Hampshire on our schedule from Pack Manadnock.

Correspondence

Longdale, Alabama Harold, W4VUO says:

"Sure enjoyed your new VHF column. However two-meter activity here in the southeast could use quite a shot in the arm compared with what you logged the first night 'Big Bertha' was up. My best DX to date is three hundred miles in six months of operating. I am running low power at present (30 watts) to a twin five beam, *but* one hundred watts to a sixteen element co-linear beam very soon.

If you publish a calling Frequency Box for skeds, I sked W4EW at 2000 nitely on 145.350, which is the Alabama net frequency. So 73, keep up the good work."

Mighty glad to hear from you Harold, we're checking your frequency nightly and hope to hear more from you.

Salt Lake City, Utah Jay Farnsworth (W7WLV):

"Dear Sam, Great Guns! Finally we have got a real VHF section in a ham magazine. Let's let the forty-meter boys know that we do exist. I got me a Technician ticket and believe me I am not even interested in a General Class. After all anyone can get on forty and make contacts but let some of these guys try six meters and we will see just how good they really are. Hi! If my plans develop as I hope they will I hope to put Utah right in there with the rest of the VHF amateurs.

Now have small twenty-five watt rig on six meters and hope to have a two-hundred watt rig on soon. Also am looking over the six-meter beams on the market.

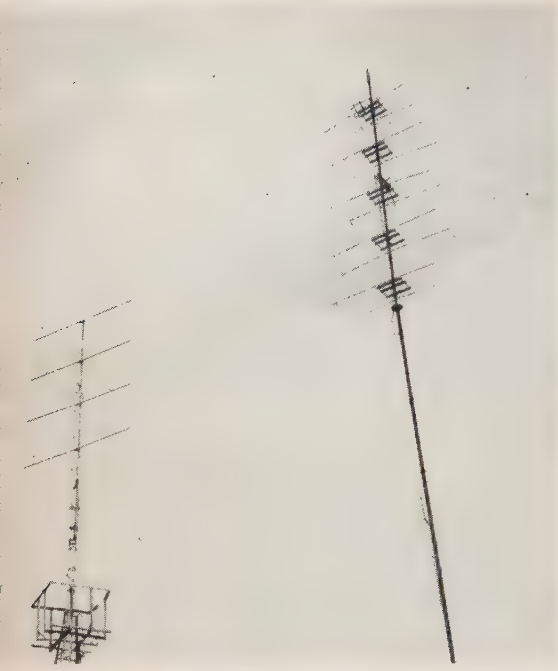
Let's get some good ideas on home-built rigs and when who is on. Also I am available for anyone wanting a Utah contact. Also interested in exchanging ideas and letters with anyone on the six-meter band. Am new on this band and can really use a lot of help. Hi!

Very good luck with your new column and may it grow."

Anybody for a sked with Utah?

Livingston, Texas Bob Kurth (W5IRP) reports:

"Enclosed pictures of W5IRP/5 at Lufkind, operating with *Gonset Communicator* into six-bay channel nine atop five hundred foot tower.



Two-meter beam in use at W9EHX, McLean, Illinois

Two-meter activity very slow here at present time. We are operating between 0630 and 1715 CST and at 1230 CST, 1800 CST and around 2200 CST. Stations worked at these times have been W5TEG, KN5BDP, WN5KSZ (Lufkin); W5IHS (Eagle Lake), W5IVU (Edna); W5AJG (Dallas); WN5JUS (Bryan).

The Houston activity is way off. Must be the very hot weather we have been having."

I liked your picture from the bottom of the tower looking up, Bob. How about one from the top looking down?

Winslow, Arizona Don Madison (W7WYZ), V.P. in charge of UHF of the Northern Arizona Amateur Radio Club, says:

"I am active on six-meters and run a very simple twenty watts: 12AU7-2E26. It's not much, but *it works*. The antenna, a folded three hundred ohm dipole. Not real hot for DX. A three element beam is contemplated for this winter. It will be in operation next spring. By then I hope to make a schedule with someone and do some propagation work. Well, I have contributed, now I feel I have done my share."

Keep 'em coming Don. We sure want to hear how you're progressing. I'm confident you won't have any trouble getting skeds.

Fostoria, Ohio Bill Radcliff (W8LAH) writes: "Missed you this morning 8-8-55, was working west and when Charley, W8SR was able to contact me about 8:00 a.m. ES I was unable to hear you.

Local activity is fair with new stati getting on, but no openings of more th three hundred miles. Have been checki the band in the mornings from 6:30 a. EST on, but no DX coming through. W into Illinois and Wisconsin about eve morning.

How about a contest on six meters, w all the new stations getting on the band? contest of some kind could keep the activ alive on the band the year around. I ha been working ground-wave into Clevela Akron, and Decatur, Indiana about eve evening when the heat will let me get the shack.

Went to Turkey Run, had a swell tim Had a good rag chew with Walt, W8ZC We had rooms at the same Motel in Ro ville.

Send a few more Log Sheets as I exp to have a good score to turn in this mon Will try and dig up more news for n month." *Glad to hear from you Bill. I got seventeen states so far with my sixty-f element job. Better polish me up anoth one, this one is beginning to look pre small.*

Nashville, Indiana Harty (W9FVI) reports our signal from New Hampshire with the f lowing:

"Just a short note to advise t W1FZJ/N.H. was heard here in Bean Bl som (forty miles south of Indianapolis) c ing CQ on CW at 8:41 CDT plus f minutes. The signal was a solid S8 with QSB. I must confess that the call did n register until fifteen minutes or so later wh it began to dawn on on me that I had se the call in print somewhere recently. checked the Two-Meter Standings to avail. Finally the new VHF column in C dawned and sure enough, there it was.

Conditions to the East were better th usual here this a.m. and I had just work W8MVE and W8LAH when I ran acr your bang-up signal. Nothing else east Ohio was heard during the morning.

I cannot key the 522 here, so gave y a shout on phone to no avail. We will able to key the new 829B final which is co ing up here." *Sorry we missed you, Har Hope to work you in the near future.*

Waterloo, Iowa Russ (WØBCB) reports:

"I enclose my SSW monthly score sh for the month of July. Only one opening any consequence and that was the one July 9th into the Dakotas. The band l been spotty and conditions bad. We h had a very hot spell with hot evenings a I guess that accounts for little temperat

inversion. Will mail you my August report but maybe cannot compete with local gang. Hi! The rest of the boys around here are going to give me competition and that's what we want to stir up more activity on the band.

I have one schedule with WØQZP at Manly, Iowa, a distance of about seventy miles from Waterloo. Tuesday night at 8:30 p.m. CST.

Worked WØEMS last night, about one hundred and eighty miles. Nice QSO, his signal about S9. Frank said he has been on almost every night but said band has been lousy for him. He mentioned that he heard several Texas stations last month. Frank has a new thirty-two element resonator beam." *You were high scorer for Iowa in July, Russ. Keep up the good work.*

Elizabethtown, Kentucky · Shelby Ennis (W4WNH) is looking for skeds. He says:

"Wonder if you know of anyone up in that part of the country who would want to make a sked with me? I'd like to sked a W1, W2, or W3, between 0500-0630 and after 1900 CST. My frequency is about 144.128. All skeds on CW." *I'm looking for you every night, Shelby.*

Springfield Gardens, Long Island, New York W2HNG writes:

"My two-meter antenna system is made up of two (5-over-5) beams, one horizontal, the other vertical, mounted on one mast above a C rotator. They've come down three times now in storms. Can you make any suggestions on how to mount these two beams satisfactorily?" *Anybody know how to keep a beam up?*

And in case anyone is interested in working **Utah** on two meters, we have a report from Victor (W7QDJ), at **Clearfield, Utah.** Vic is running two hundred watts to a pair of VT 127A's. Antenna is sixteen elements, thirty feet high. Frequency 145.33 Mc. Vic also works six meters and has garnered nineteen states so far.

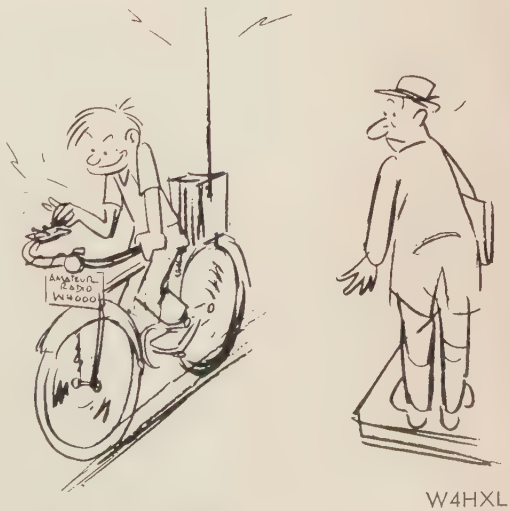
Paul (W1PYM) passed on the following letter from Walt (W7PVZ), Olympia, Washington:

"OM, How about a little information on that FB 826 final that I can just see the 'bottle tops' of, in August *CQ* magazine, hm-m?!

The gang out here in the Great Northwest is slowly going to high power. But average power level is still below a hundred watts. Receiving equipment is a different story, however. The stations being so widely separated that one's noise figure must be way down to pull'm through. Average out here now is about 4 to 5 db, but some are now cruis'n around 2.2 to 3.5 tested on calibrated laboratory equipment. Mine's about 3 db, running into only the lower megacycle of my *Collins 75A-4* receiver.

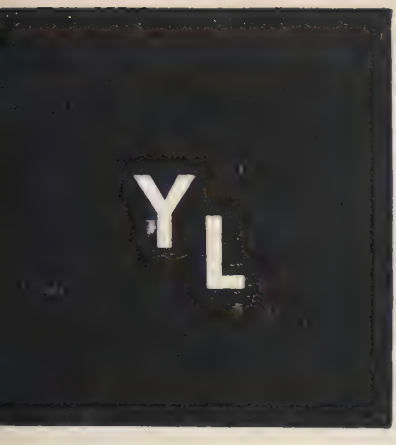
Also would like to build extreme long Yagi antennas and phase them. Who do you know that might be able to pass along that type of information?" *We've got an article on that 826 final coming out next month, Walt. Hope to hear from you soon again.*

Peck (W9BPV) and John (W9WOK)



W4HXL

powder puff derby II



Monitored by

Louisa B. Sando, W5RZJ

Jicarilla Apache School, Dulce, New Mexico

The AWTAR Radio Net

On this past July 2nd, with smog blanketing ne Los Angeles area, 51 light planes, out of n original 56 entries, clustered at the far end f the runway at Long Beach Municipal Air-ort. There were Cessnas, Beechcraft Bonan-as, Stinsons, a Navion, a Swift, Luscombes, ellancas and Pipers—all impatiently waiting o be off in the ninth annual All-Woman Trans-ontinental Air Race, or Powder Puff Derby s it is popularly called.

As the 95 women fliers—from a 16-year old ith 20 hours flying time, to professional fliers ith commercial licenses, and even grand-nothers—waited tensely for the weather to lear, the AWTAR Amateur Radio Net at Long each swung into action. First traffic consisted f relaying the Beaumont weather periodically s the weather there determined the conditions ver the mountains, a big hurdle for the little lanes.

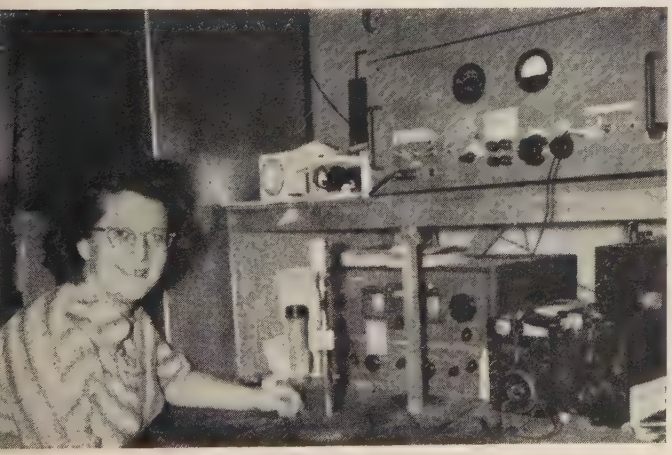
Shortly after 2 o'clock the planes were off, pproximately one a minute, and all were air orne by 3:08 p.m. PDT. The net hummed with eparture times, expected arrival times, RON's (Remain Over Night plans). Traffic also was handled for the race officials as well as for the pilots and their families.

As in the 1954 race W6NZP, Evelyn, was the radio chairman for Long Beach (see "The Powder Puff Derby," CQ, Oct., 1954). With the help of many Los Angeles area YLs she operated W6MWO/6 (L. A. YL club call) on 75 meters in the control tower building at the Long Beach Airport, while W6LMQ, Elleanor, kept her station on the air at home, also on 75 (3950 kc). K6CPX, Marian, operated her home station on 20 phone and kept in contact with W1UKR in Westfield, Mass., destination of the race, either direct or by relay stations.

W8EBM, Sheila, operating as KL7BHE/8 during the Derby, held down the 2-meter rig at Dayton, Ohio, along with OM KL7PIV/8. Sheila comments "dark circles" may be due to their 10-day old son (born Aug. 1st).

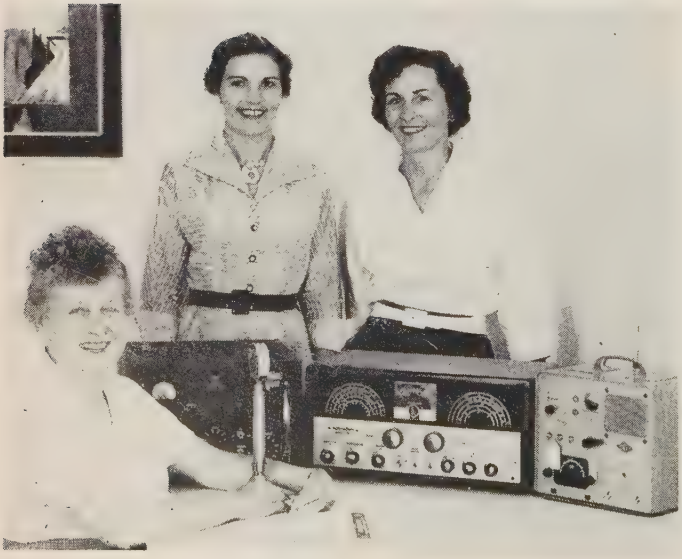
An alternate 6-meter mobile to W6MWO also was set up.

At the beginning of the race W6NAZ, Lenore, operated mobile at the starting line, giving the take-off time of each plane as it left the ground. After the planes had taken off, K6CPX, who was monitoring 75, relayed the take-off times directly to Massachusetts to the air race



W1UKR, Eunice, was chairman for the entire 1955 AWTAR radio net. Licensed in 1951, she works 40 and 75 phone, is OPS, secretary of the Hampden County Radio Club, a member of the Deep Sea Drag Net, of the TCPN, and has made BPL several times. W1UKR now uses a Johnson Ranger which she wired herself.

Winner of third place in the '55 AWTAR was plane No. 19 piloted by Esther (Jerry) Gardiner (right), who is W1YUO. Jerry's co-pilot was Clarissa Holcomb, and she was flying her own Bellanca, she shares with OM W1VLT. A 99'er, this was Jerry's third TAR. Starting with a Novice ticket in '53, W1YUO operated aeronautical mobile on 2 meters every weekend. Jerry has two jr. ops.



Chairman for the Long Beach end of the net was W6NZP, Evelyn (left). Two of the many L.A. YLs assisting with the operation were K6CPX, Marian, and W6LMQ, Elleanor

officials, and W6LMQ relayed it on 75 to W6FLD at Blythe and to Phoenix and Tucson, next three stops in the race. W6LMQ operated almost continuously throughout the Derby.

Others assisting at Long Beach or relaying in Calif. included W6UHA, Maxine; K6CDB, Eileen; W6JZA, Elsa; W6TDL, Clara; W6CEE, Vada; W6KER, Gilda; W6DQD, Mary; K6GMX, Jayne; W6's OZS, FLD, GKM, UXW, HWM, K6DQA.

With the late start from Long Beach it was about 5 p.m. MST when the planes hit Phoenix, Ariz. Here the net had been set up by W7MID, in lieu of his XYL, Jan, W7PWU, who was in Texas. The Maricopa Joint Council communications bus was operated portable from the airport by W7RUX and W7OQF, both of whom also are pilots. They relayed to W7PWU in Phoenix and when the planes came in were in direct contact with W7LAD in Tucson so that the messages were handled promptly as each girl arrived, which seemed to be about every 20 seconds, according to W6PEB/7, Melba, charter 99'er who helped at the airport. The communications bus had been parked a couple hundred feet away from the time clock so some leg work was involved—"mostly mine," says Melba—and with the temperature at 105 degrees!

About 20 planes stayed overnight at Sky Harbor Airport in Phoenix. When plane No. 25 came in the copilot went for a dip in the airport pool. Meanwhile the pilot ran up her engine for a magneto check. At that moment plane No. 20 taxied in rapidly and on making the turn before the clock the left wingtip plunged into No. 25's spinning prop. The prop was unhurt, but the wing was well ground up. Two of the airport operators are women and 99 members (the "Ninety-Nines" sponsor the race), and they had arranged to have skilled mechanics on duty at the hours the girls might need them. By 2 a.m. the damaged wing had been removed, replaced, and the identification numbers painted on it. After a couple hours of sleep the mechanic was up at 4 a.m. to test the plane and by 6 a.m. the girls were on their way again!

As far as we can learn, the net at Tucson, Ariz. was operated by W7LAD, chairman, and W7's PJM and MQE, while El Paso, Tex., was covered by W5KBP and W5IAF. Both of these stops had some worrisome hours when No. 15 failed to show up long after she should have been in El Paso. The pilot realized she was badly off course and seeing an airport below landed her Piper. No one there spoke English, but a Mexican pilot drew her a map showing the border a hundred miles north, and she took off before authorities could stop her. The net was glad to report her eventual safe arrival at Tucson.

W5GGC and W5GOS headed operations at Midland, Tex. Office space was furnished by Southwest Air Rangers, and it was well situated only fifty feet from the Official time clock. The station, consisting of a Viking II, VFO, 75A3 receiver and a Windom antenna put up by W5AMU, was operated by W5's GGC, QGR, BZT, HPR and GOS. Midland was one of the mandatory stops so the net had numerous messages for the race participants and they relayed messages regarding No. 24 that was forced down near Spur, Tex. with engine trouble and then nosed over to break its prop.

At Wichita Falls, Tex. W5QJY and W5QJZ, Garlena, had charge of the AWTAR net. Garlena operated the control station while her OM and several others helped out. They used mobile stations at Kell Field, which is about ten miles from town. Information and traffic were relayed from the field to W5QJZ and one

W5QJZ, Garlena, with OM W5QJY, had charge of AWTAR net at Wichita Falls, Tex. Licensed five years, Garlena holds Advanced Class and operates 10, 75 and 160. She has three jr. ops and is a school teacher, having received her B.S. this summer.

When plane No. 17 crashed near wheeling, W. Va. W8KXD rushed to the scene with his mobile rig to handle messages and get photos.

station was on 20 meters to keep in touch with Long Beach and Westfield. In addition to the regular traffic an emergency message was sent to Westfield when the time clock went out of order and inside of 30 minutes they had permission from officials to use another clock.

Stations participating at Wichita Falls in addition to W5QJY-QJZ, were W5's MQW, GPO, VNL, ZAU, DWS, AVA, K5KIQ, W9FOM/5. Many others helped in getting messages to destinations, W5SMK at Allanger, Tex. was one.

The Tulsa, Okla. radio net was headed by W5PA.

Thirty-two of the AWTAR planes landed at Springfield, Mo. Here the net was organized by WØHUI, who is EC for that area. WØEBE, Civil Defense Communications Officer for the area, had charge of the airport 10-meter station, which relayed to WØHUI who was operating his home station on 75. The Southwest Missouri Amateur Radio Club members were active in the Derby net at Springfield and several operated at the airport, including WØ's NHO, LQC, ICW, QWS, TWL, HGD, CZC, SPU, SOZ, PXW, TUV, SPR, KØAEI,

Heading operations at Springfield, Mo., were (l. to r.) WØEBE and WØHUI, and WØHUI's brother W5VNV was one of the operators.

W5VNV.

At the St. Louis stop a portable station was on 2 meters operating at the airport, under the call of WNØZWN/Ø, relaying to the fixed station of WØDLS approximately three miles away. At this point information was put on 75 meters or relayed to WØPUS, WØVZC or W9YWL, who were handling traffic on 20 meters. The station of WØDLS was used for coordinating traffic and was manned by WØDLS or WØMSX. Other operators participating were WØYIJ, MBE, IFL, WNØZWN.

A little excitement occurred at St. Louis during the race when a private plane crashed in the river near the airport. Before it was determined that the plane was not participating in the race the net put out the news of the crash to Westfield, but later had to retract it. The day most of the planes hit St. Louis there was considerable thunder-shower activity and two of the Powder Puffs had to be talked in from about 30 miles out. St. Louis net chairman WØMSX, gives special credit to WØDLS for his long hours on the job, going without sleep, to keep things rolling.

Next stop on the route was Terre Haute, Ind. Here the traffic was relayed from Holman Airport on 6 meter mobile by the Wabash Valley Emergency Corps with operators W9LLG, UUU and IHO, to W9ZHL. Then it was put on the 75-meter net by W9QOX and W9ZHL. Net chairman W9ZHL appreciated the fine cooperation from the airport manager and Mrs. Hurt, past president of the 99's.

The operators in Dayton, Ohio assisting net chairman W8DWT in handling traffic for the AWTAR were W8FPZ on 2 and 75 meters, KL7PIV/8 and his XYL Sheila, KL7BHE/8, operating on 2 and 20 meters. Operation at W8DWT was on 2, 20 and 75. A 2-meter station was installed at the airport and all stations were in constant contact with each other and the airport on 2 meters. Traffic was handled with W1UKR/1, W8KXD, W9ZHL, W9YWL and W9SVL.

Plane No. 1, the first to reach Phoenix, was greeted by W6PEB/7, Melba (left), and ex-W7JOJ, Marjy. Melba, a charter member of 99's, has been flying since 1929 and has held her amateur license for over twenty years.

One emergency message was initiated at Dayton when plane No. 24 was forced down near Lubbock, Texas. The pilot, flying solo, was one of the flying grandmothers in the AWTAR. 99'ers at the local airport were anxious for a report. A reply was received in less than 45 minutes indicating that the pilot was okay.

Stations in operation for the Derby net in Wheeling, W. Va. were W8PHY (net chairman), KXD, IHB, YFX. All information was received from the Ohio County Airport by telephone and W8PHY reports wonderful cooperation given by the airport manager.

This whole area was plagued with thunderstorms and on the afternoon of July 5th No. 17, flying a Cessna 140, made a forced landing on very undesirable terrain. The crash occurred

YL Nets—Phone

Band	Freq. (kc.)	Day	Time	NCS
75	3900	Wed.	9:30 a.m. EST	W8ATB
	3900	Mon.	3.00 p.m. PST	W7HHH
			(alternate—W7NJS)	
	3915	Wed.	9:00 a.m. PST	W6PJF
			(alternate—W6GQZ)	
	3900	Wed.	8:00 a.m. EST	W1YPT
	3970	Mon.	10:00 a.m. CST	WØUDU
			(alternates—WØBFW, WØPIK)	
	3880	Thurs.	8:30 a.m. CST	W5WXY
		(Texas YL Round-up Net)		
			(alternate—W5ZPD)	
40	7215	Thurs.	9:00 a.m. EST	K2IWO
20	14,240	Thurs.	11.00 am. PST	W6UHA
			(alternate—W1TRE)	
10	28,900	First Tues. of each month, 9 p.m. EST (QR Mary Round-table)		

only ten miles from the net stations and considerable traffic was handled. W8KXD, who was covering the Derby landings at the airport verbally and also was standing by with a mobile rig, reported the crash to the net and then proceeded immediately to the scene.

Net chairman at Reading, Pa., W3BFK reports that the Civilian Defense radio communication truck was stationed at the time clock at the Reading Airport. Continuous communication was maintained with W1UKR/1 in Westfield. W3BFK credits W3BN and W3CCH as being the "main wheels" of the operation, assisted by about ten operators, all members of the Reading Radio Club. Some stations in the Long Island area relayed reports when the static level got very high on 75 meters. Reading was a mandatory stop and 46 flights cleared the airport. Special traffic concerned No. 32 which landed at an airport near Allentown, Pa. because of radio failure, and then taxied into an obstruction damaging the propeller. Nos. 22 and 40 were delayed by thunderstorms and while No. 22 finally reached Westfield, No. 40 withdrew from the race near Pittsburgh.

AWTAR set-up at Holman Field, Terre Haute, Ind. L. to r.: John Griffith, airport manager; W9LLG; Mrs. Hurt, past president of 99's; W9UUU.

Chairman for the entire AWTAR radio net, W1UKR, Eunice Gordon, was also chairman for Springfield, Mass., destination of the race (finish line actually Barnes Airport, Westfield, Mass.). Eunice had spent many months organizing the cross-country net. During the Derby itself she and her OM, W1KUL, lived right in the "shack"—which was on the second floor of the administration building at Barnes Airport. They slept there on cots and ate out of cans for all the days of the race! W1UKR/1 was on 75 with 700 watts. They also used a Viking on 20 with a beam. A 2-meter link kept messages flowing between the airport and the Sheraton-Kimball Hotel in Springfield, headquarters for the AWTAR officials. About thirty Hams from the Springfield area participated,

Chairman for the entire AWTAR, Betty Gillies, W6QPI, did not participate in the race, but as soon as the participants were under way Betty with two other AWTAR officials took off from Long Beach in Betty's Navion. They took the northern route across the mountains to save time and spent the first night in Winslow, Ariz. When they landed the CAA told them that No. 15 was lost but could give no other information. Betty called W7PJY in Winslow who immediately went on the air and soon called back to report that No. 15 had landed at Tucson. The next night W6QPI was at Richmond, Ind. where she called W8FPZ in Dayton to check that everyone was safely "tucked in." The next day No. 15 was in trouble again and when W6QPI landed at Dayton W8FPZ contacted Midland via relay and got the complete story. So once again they took off knowing that all was okay.

YLRL Anniversary Party

YLRL VP W9YBC announces the 16th Annivesary Party will be held on these dates: Phone, Dec. 7-8; CW, Dec. 14-15. Details will be in next issue.

In addition to this personal experience, AWTAR Chairman W6QPI comments, "From every report I heard the Hams did a wonderful job and they rendered us a very valuable service. If there is any way you can tell the gang how much we appreciate all they do, please tell them. I have written letters of thanks to the chairmen at each of the stops but there are so *many* others who give so much of their time to the net. They are truly wonderful people to work with us as they do, for such long hours and for so many days. I certainly hope we will always be able to have an AWTAR radio net."

Sentiment of the Hams operating in the net can be summed up in W8DWT's words, "It's been a lot of work, an enjoyable experience, and we'll be looking forward to helping the girls again next year."

Letters . . . to the editor

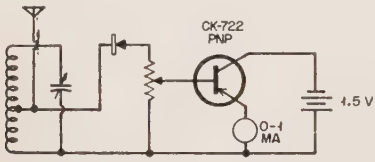
C. G. Training Station
Groton, Conn.

CQ MAGAZINE
67 West 44th St.
New York 36, N. Y.

Gentlemen:

Glad to see that *CQ* is expanding to keep pace with the great strides the field of electronics is taking, especially in the VHF region, and transistorized equipment.

. . . A hint which should be of great interest to hams who have built the transistorized field strength meters which have become so popular recently, is to tap up about a third of the turns from ground, and make antenna and rectifier connections at this point as shown in the sketch



of the meter worked up by another instructor here, George Shipley, W4OGQ. Also note that there is a sensitivity control which has been found to be extremely useful, especially when taking readings near the transmitter. It was found that the circuit caused considerable loading of the tuned circuit, lowering the "Q," and causing very broad tuning. Tapping down the coil caused such an increase in the "Q" that not only was tuning made needle sharp, but the meter was found to be about twice as sensitive.

Hoping that these suggestions may be helpful, I remain,

Sincerely,

C. E. Miller

Santa Monica, Cal.

Dear Wayne:

I am relatively new to amateur radio and so hesitate to make a suggestion, however, I have talked to several "hams" about the idea and they feel that it might have real merit.

The suggestion is that *CQ* magazine appoint some official representatives who would act as monitors for outstanding courtesies on the band. It is the common thing to hear fellows really go out of their way to perform a service but on so many occasions I have heard of courtesies that would be well deserving of recognition by someone other than the person for whom the service or courtesy was performed. My suggestion therefore is that (1) the monitors be appointed by *CQ*, (2) that they not be allowed to recommend a person who does a service for them—it must be a monitored service to someone else, (3) that the call letters of the station be listed appropriately each month by *CQ*, (4) that an appropriate certificate or card be mailed by *CQ* to each station so honored or recognized.

While courtesies of the band make ham radio a hobby to be proud of—wouldn't it be good to tap a few of the fellows on the back for recognition that they didn't expect.

A. Ewing Konold, K6AHL

Teaneck, N. J.

Dear O.M.,

After reading W2GZU's editorial in July CQ, all I can say is AMEN. I have never read an article which expressed the true spirit of "Ham" radio more accurately. Any ham who is truly proud of his hobby should read this article a few times, then tack it on his shack wall where it can be plainly seen (maybe next to his prized "ticket"). This way it would serve as a constant reminder of what we have and what we owe to our hobby and to the country which permits us to enjoy that hobby. Keep up the good work CQ.

R. T. Hasbrouck, K2CCI

Madison, Wisconsin

Dear Ed,

I would like very much to have a cost estimate included with the articles on home constructed gear. I am a build-it-yourself fan, and plan on building my whole high power rig. Your last issue (July) contained an 813 final and a dandy looking VFO, but I have no idea what they would cost. An old timer, familiar with the cost of most parts, should be able to hit it pretty close. I have to list each item and then go thru the surplus lists to arrive at a figure. Still haven't figured that 813 final as yet.

Well, so much for that. You've got a good magazine, and I hope you keep it that way.

Paul LeMere

Dearborn, Michigan

CQ Journal

Attention: Wayne Green (Ref. your letter of 6-9-55)

In regard to the use of the mobile receiver for reception of single sideband stations, I agree with Ed Meador, W6SUW.

I added an r.f. gain control in my mobile receiver which prevented the overloading action, but the receiver

[*Continued on page 113*]

WORLD-WIDE DX CONTEST SCHEDULE

First weekend—Phone
Second weekend—CW

Time Zone	Starting Time	Ending Time
Greenwich Mean Time (GMT) (London)	Saturday, Oct. 22, 0200 Saturday, Oct. 29, 0200	Monday, Oct. 24, 0200 Monday, Oct. 31, 0200
U.S.A. Eastern Standard Time	Friday, Oct. 21, 9:00 PM Friday, Oct. 28, 9:00 PM	Sunday, Oct. 23, 9:00 PM Sunday, Oct. 30, 6:00 PM
U.S.A. Pacific Standard Time	Friday, Oct. 21, 6:00 PM Friday, Oct. 28, 6:00 PM	Sunday, Oct. 23, 6.00 PM Sunday, Oct. 30, 9:00 PM

A Reminder . . . the 1955 CQ World Wide DX Contest

Log sheets and WAZ lists may be obtained from CQ, 67 West 44th Street, New York 36, New York. For the full rules of the contest see the September 1955 CQ, page 78.

GOUGH ISLAND Scientific Survey

ZD9AD

40° 20' S, 9° 57' W.

Operator G3HPM

Band .....Mc/s

Date .....

QTR. .....GMT

Rpt. RST.....

RSGB

Telecommunications
CAMBRIDGE ENGLAND

Philip J. Mullock

Expedition to Gough Island—

An eight-man expedition to Gough Island, a lonely South Atlantic speck on most maps, 1,500 miles from the Cape of Good Hope, will sail from England at the end of August to conduct a six-months' scientific exploration of this remote island.

One of the members of the expedition, Philip J. Mullock, G3HPM, is planning to set up amateur radio operations on the island and should be on the air by the middle of October. He is taking along a good communications receiver, a 150-watt transmitter and plenty of antenna wire. Operation is planned for all amateur bands from 160 through 10 meters. VFO operation will be used on most bands and DX'ers are hereby warned that they should not call ZD9AD within 10 kc and that any stations who break in during a contact will be blacklisted.

There is a good possibility that Gough Island may be declared a separate country for amateur radio purposes. All QSL's will be handled through the RSGB QSL Bureau (c/o A. O. Milne, G2MI, 29, Kechill Gardens, Hayes, Bromley, Kent, England) since mail deliveries to the island are uncertain at best. It is unlikely that any QSL's will be answered until the expedition is completed so when you make the contact be patient.

Like its nearest neighbors, the three islands of the Tristan da Cunha group some 260 miles to the north north west, Gough Island is one of the few high peaks that pierce the ocean surface from the under-water "Mid-Atlantic Ridge." Lying in the path of the "Roaring Forties" there are frequent storms and high winds which gave it a cold, damp, and foggy climate.

The eight members of the expedition are to be landed with about 20 tons of stores and equipment by a frigate of the Royal Navy from Simonstown, at the end of September. A hut will be built near the beach at the mouth of the Glen which provides access to the interior. At this base 40 ft. wireless masts, which will provide their link with the outside world and the means of transmitting weather reports five

times a day, will be erected.

Uninhabited by man, this precipitous island measures about eight miles by four, and rises to nearly 3,000 ft. Mountaineering techniques will have to be employed to enable the party to travel freely over the area, and the geologists to examine the rocks—the cliffs rise sheer for 1,000 ft. from the storm-beaten western beaches.

The island has been described as a "naturalist's paradise"; it is the only remaining sub-Antarctic island which has not been thoroughly investigated. It has lush vegetation of tree-ferns, tussock grass, and mosses, and a rich bird life. It is the home of a unique species of flightless *Rail*—something like the moor-hen which, through processes of natural selection has lost the use of its wings; the same will probably apply to many of the insects. Large numbers of albatrosses and penguins nest on Gough, and every year increasing numbers of Elephant Seals and Fur Seals haul out to breed on the beaches. That the undertaking is eminently worthwhile is indicated in an article by a member of the Scottish National Antarctic Expedition which visited the island in 1904: "No doubt, looked at from an impartial standpoint, Gough Island is but a relatively insignificant rock in mid-ocean, but its very isolation makes it of great interest. It may throw light on some former continuity of land in the Southern Hemisphere, and it cannot fail to elucidate various problems of biological distribution when its fauna and flora have been thoroughl investigated. It is for these reasons that it further exploration is so much to be desired."

Each member of the party was selected t carry out a particular scientific role in the pro gram of research. The original estimate of th cost was about $15,000, but due to the larg measure of support extended by industry, whic has provided most of the necessary equipmen it has been possible to economize on this figure all members have agreed to go without an form of pay since sufficient funds have no been obtained, though it is hoped that mor money will be forthcoming to prevent econ omies having to be made in the scientific pro grammes.

There has been no land-based survey of th island, so one of the tasks of the expeditio will be to make accurate maps. Other aims ar to provide reports on the scope for possibl development of any natural resources. It unlikely that there will be any useful mineral but there may be a potential sealing industry This might be developed to exploit the Fur Sea for its valuable pelt, and the Elephant Seal fo oil.

A temporary official Post-Office with ZD9AI as postmaster will be established on Goug Island, and the stamps of Tristan da Cunh with a special cancellation mark used on ma will be sent occasionally via Crawfish trawle fishing in that area.

3Ø MOBILE SUPPLY

[*from page 15*]

the writer (750 volts at 400 milliamperes) although the alternator has sufficient capacity to produce 1500 volts at 400 m.a. if you need it. This higher output could be derived by means of six transformer-rectifier combinations. If you believe in the Law of Diminishing Returns there should be little incentive to strive for more than the 600-watt power level.

Unless you have had professional acquaintance with 3-phase systems you may not realize the advantage of using such a power supply. Common knowledge among power and industrial engineers is the fact that practically zero filtering is required with 3-phase full-wave rectifiers to reduce ripple to negligible proportions. The six half-wave lobes of rectified sine wave follow one another in time-sequential order at such short intervals that, in the present system diagrammed in Figure 1, no filtering in addition to the capacitors in the individual voltage-doubler circuits is needed.

To furnish 250 volts for the speech amplifier and exciter stages an attempt was made to make use of one half-wave output but this merely succeeded in unbalancing the rectifier due to unsymmetrical loading and a ripple developed. A large dropping resistor from the high voltage would have been wasteful of power so an individual low-voltage 200 m.a. supply was adde whose operation has been very satisfactory.

In many installations the 24-volt supply fo the relays would not be required. In this eve the low voltage and bias supply could be com bined on a single transformer, using a voltag tripler with one section of the tripler being use for bias, in the manner employed in many T sets.

The reverse-connected filament transformer T_1, are apparently not too critical. An easy wa to check the suitability of a transformer is t connect it to your alternator and use a 10 watt 115-volt lamp as a load. At slow-idle en gine speed sufficient output will not be obtaine but idling at any higher speed should be en tirely satisfactory. The output is likely to b low and unsteady with a fully-charged batte unless there is a battery load. This is undoub edly due to the low field current in the altern tor with no load. The load of the receiv should be enough to stabilize the system.

An old transformer, T_2, with a 30-volt se ondary wound in place of the high-volta winding furnishes the energy to power the rela circuits. Many amateurs will probably pref to dispense with this and use 6-volt relays ope ated directly from the battery.

Forecasts By:
George Jacobs, W2PAJ/W3ASK
607 Beacon Road, Silver Spring, Maryland

DX CONTEST SPECIAL

Continuing with a well established tradition, the following dates have been announced for this year's *CQ International DX Contest.*

Phone Section: 0200 GMT, October 22nd to 0200 GMT, October 24th.

CW Section: 0200 GMT, October 29th to 0200 GMT, October 31st.

Continuing with another well established tradition, this month's column will be devoted to a special study of propagation conditions affecting amateur circuits from the United States to all areas of the world during October and early November, with special emphasis on an analysis of the Contest period. In line with this analysis, this month's *CQ Propagation Charts* have been increased in scope to include nearly double the number of forecasts than usual. *Charts* have been calculated centered on New York City, Tampa, Chicago, San Antonio, Denver, Portland and Los Angeles. Since these type forecasts are generally valid for up to a 500-mile radius around the point selected as the center, they cover practically the entire United States.

Last Minute Forecast

A moderate to severe ionospheric disturbance is forecast for the period October 25-28. The period October 18-20 is expected to be unstable but the remainder of the month including the contest periods will be seasonally normal.

General Propagation Conditions October, 1955.

6 Meters: Only an occasional short-skip opening expected during October, possibly co-incident with auroral activity.

10 Meters: As a result of the seasonal increase in daytime maximum usable frequencies, and because of the general increase is sunspot activity, a considerable improvement in DX conditions on this band is forecast for October and the fall and winter months. Fairly good openings are expected on a number of days from most parts of the U.S.A. to South America and South Africa. Regular layer F2 short-skip propagation should be possible on many days between approximately 11 AM and 4 PM *local standard time.* The skip will vary between 1600 and 2400 miles. There will be a sharp seasonal decrease in the occurrence of sporadic-propagation during the fall and winter months, and only an occasional short-skip opening of this type, with the skip less than 1300 miles, is expected.

15 Meters: A considerable improvement in DX conditions is forecast for the daylight hours, with DX possible to all areas of the world. During certain times of the day this may be the best DX band. Regular F-layer short-skip propagation should be possible almost daily between 8 AM and 6 PM *local standard time,* with the skip distance between approximately 900 and 2400 miles.

20 Meters: The band will not remain open as late into the evening hours as it did during the summer months, but fair to very good world-wide DX conditions are expected from shortly after sunrise to a few hours after sunset. Regular F2 layer short-skip is expected daily from about 7 AM to 8 PM, with the skip as short as 750 miles around noon.

40 Meters: DX conditions improving on this band with conditions forecast as fair to good to many areas of the world from a few hours before sunset to shortly after sunrise. Atmospheric noise levels are decreasing and this should be the best DX band during the hours of darkness. The band should be open for short-skip propagation around the clock. The skip will be between 50 and 1000 miles during the daylight hours and between 1000 and 2400 miles during the hours of darkness.

ALL TIMES IN CST

SAN ANTONIO, TEXAS TO: (Cont.)	15 Meters	20 Meters	40 Meters	80 Meters
Central & South Africa	1100-1500 (2)* 0630-1200 (1-2) 1200-1700 (3)	0600-1300 (1) 1300-1600 (1-2) 1600-2000 (2-3)	1800-0030 (2-3)	1900-2330 (1-2)
South America	0800-1300 (2)* 1300-1700 (3)* 0630-1400 (3) 1400-1800 (4) 1800-1930 (1-2)	0600-1300 (1-2) 1300-1600 (2-3) 1600-1830 (3-4) 1830-0300 (1-2)	1830-0630 (3-4)	1930-0430 (3)
Japan, Okinawa & Far East	1500-1830 (2-3)	0700-0900 (1-2) 1300-1700 (2) 1700-2200 (3)	0100-0400 (2) 0400-0700 (1)	0200-0600 (1)
South East Asia	1730-1900 (1)	0700-1000 (1) 1700-2100 (1)	0230-0730 (1)	NIL
Australasia	1500-1830 (1-2)* 1400-2100 (2-3)	0700-1100 (3) 1400-1700 (1) 1700-2100 (2-3) 0200-0400 (1)	0100-0700 (2-3)	0200-0600 (1-2)

ALL TIMES IN MST

DENVER, COLORADO TO:	15 Meters	20 Meters	40 Meters	80 Meters
Europe & North Africa	0900-1200 (1-2)	0600-1100 (1) 1100-1530 (1-2)	1630-0030 (1-2)	1800-2300 (1)
Central & South Africa	1100-1500 (0-1)* 0800-1200 (1) 1200-1600 (2-3)	0600-1200 (0-1) 1200-1500 (1-2) 1500-1900 (2-3)	1700-0000 (2-3)	1800-2230 (1-2)
South America	0900-1600 (2-3)* 0600-1200 (2-3) 1200-1700 (3-4) 1700-1830 (2)	0600-1500 (2) 1500-1800 (3-4) 1800-2000 (1-2) 2000-0300 (2)	1800-0500 (3-4)	1900-0330 (2-3)
Japan, Okinawa & Far East	1430-1800 (1)* 1300-2000 (2-3)	0600-1000 (1-2) 1000-1500 (2) 1500-2300 (3)	0030-0700 (2-3)	0100-0630 (1-2)
South East Asia	1430-2000 (1)	0600-0930 (1-2) 0930-1600 (0-1)	0200-0600 (1)	NIL
Australasia	1500-1900 (2)* 1200-1700 (2) 1700-2000 (3)	0600-1000 (2) 1000-1700 (1) 1700-2200 (2-3)	0100-0700 (2-3)	0130-0600 (1-2)

ALL TIMES IN PST

LOS ANGELES, CALIF. TO:	15 Meters	20 Meters	40 Meters	80 Meters
Europe & North Africa	0830-1200 (1-2)	0600-1100 (1) 1100-1500 (1-2)	1600-2330 (1-2)	1900-2200 (0-1)
Central & South Africa	1100-1500 (0-1)*	0600-1400 (0-1)	1630-2200 (2-3)	1730-2100 (1-2)

ALL TIMES IN PST

LOS ANGELES, CALIF. TO:	15 Meters	20 Meters	40 Meters	80 Meters
South America	1000-1530 (2-3)* 0600-1200 (2-3) 1200-1600 (3-4) 1600-1830 (2)	0530-1500 (1-2) 1500-1800 (3-4) 1800-2100 (1-2) 2100-0300 (2)	1730-0400 (3-4)	1830-0230 (2-3)
Guam & Pacific	1500-2000 (1-2)* 1100-1700 (2) 1700-1930 (3)	0730-0900 (2-3) 0900-1800 (2) 1800-2130 (3)	2300-0630 (3-4)	0000-0600 (2-3)
Australasia	1400-1900 (2-3)* 1030-1730 (2) 1730-2000 (3)	0700-0930 (2) 0930-1800 (1) 1800-2200 (3)	2300-0630 (3-4)	0030-0600 (2-3)
Japan, Okinawa & Far East	1400-1800 (2)* 1300-1700 (2) 1700-2030 (3)	0700-1200 (1-2) 1200-1800 (2-3) 1800-2130 (3-4) 2130-2300 (1-2)	2300-0730 (3-4)	0030-0600 (2-3)
South East Asia	1400-1900 (1)* 1330-2100 (2-3)	0700-1100 (1-2) 1100-1900 (0-1) 1900-2300 (1-2)	0200-0700 (1-2)	0300-0500 (1)
Hong Kong, Macao & Formosa	1500-1800 (1)* 1400-2000 (2-3)	0700-0900 (1-2) 1330-1800 (1-2) 1800-2200 (2-3)	0100-0600 (2-3)	0200-0500 (1-2)

ALL TIMES IN PST

PORTLAND, OREGON TO:	15 Meters	20 Meters	40 Meters	80 Meters
Europe & North Africa	0800-1130 (1)	0700-1300 (1)	1600-2100 (1)	1800-2200 (0-1)
Central & South Africa	1200-1400 (0-1)* 1100-1430 (1-2)	0700-1400 (0-1) 1400-1730 (1-2)	1600-2100 (1-2) 2100-2300 (1)	1730-2000 (0-1)
South America	1200-1500 (2)* 0700-1200 (2-3) 1200-1600 (3-4) 1600-1800 (1-2)	0600-1100 (1) 1100-1400 (2) 1400-1800 (3-4) 1800-0300 (1-2)	1800-0300 (3)	1900-0200 (2)
Australasia	1430-1830 (2)* 1130-1730 (2) 1730-1930 (3)	0700-0930 (1-2) 0930-1700 (1) 1700-2130 (2-3)	2300-0600 (3)	0030-0530 (2)
Japan, Okinawa & Far East	1400-1730 (1)* 1300-2000 (3)	0700-1200 (1-2) 1200-1800 (2-3) 1800-2100 (3-4) 2100-2230 (1)	2300-0630 (3-4)	0030-0600 (2-3)
South East Asia	1430-2030 (2)	0700-1100 (1-2) 1100-1600 (0-1) 1600-2300 (1-2)	0300-0630 (1-2)	0330-0600 (1)

Symbols For Number of Days Path Forecast to Open:

(0) None (1) 10% (2) 25% (3) 50% (4) 70% (5) 85% or more

* Indicates time of possible ten-meter openings.

The CQ Propagation Charts are based upon a CW radiated power of 150 watts. These

ALL TIMES IN EST

NEW YORK CITY TO:	15 Meters	20 Meters	40 Meters	80 Meters
Western & Central Europe	0800-0930 (1-2) 0930-1200 (2-3) 1200-1400 (1-2)	0600-1300 (3) 1300-1530 (3-4) 1530-1800 (1-2)	1630-2200 (3-4) 2200-0400 (2)	1730-0200 (3)
Southern Europe & North Africa	1100-1300 (0-1)* 0730-1100 (2-3) 1100-1430 (3-4)	0530-1300 (3) 1300-1600 (3-4) 1600-1830 (1-2)	1630-2100 (3-4) 2100-0200 (2-3)	1800-0100 (2-3)
Near & Middle East	0800-1200 (2-3)	0530-1130 (1) 1130-1530 (2-3) 1530-1730 (1-2)	1800-2000 (2-3) 2000-0000 (1-2)	1900-2230 (1-2)
Central & South Africa	1200-1500 (1-2)* 0900-1400 (1-2) 1400-1630 (2-3)	0630-1400 (1) 1400-1530 (1-2) 1530-1900 (2-3)	1730-0100 (2-3)	1900-0000 (2)
South America	0830-1700 (2-3)* 0700-1500 (2-3) 1500-1700 (3-4) 1700-1830 (1-2)	0600-1600 (2-3) 1600-1800 (3-4) 1800-2200 (1-2) 2200-0330 (2-3)	1800-0500 (3-4) 0500-0730 (2-3)	1930-0400 (2)
South East Asia	1630-1830 (0-1)	0700-1000 (1) 1600-1930 (0-1)	0300-0700 (0-1)	NIL
Australasia	1600-1930 (1-2)	0700-1030 (2) 1600-1900 (1) 1900-2100 (2-3)	0030-0730 (2-3)	0200-0700 (2)
Guam & Pacific	1400-1800 (1)	0730-1100 (2) 1500-1800 (1) 1800-2000 (2)	2300-0700 (3)	0000-0600 (2)
Japan, Okinawa & Far East	1630-1800 (0-1)	0700-0900 (1-2) 1600-2000 (1-2)	0100-0700 (1)	0200-0600 (0-1)

ALL TIMES IN EST

TAMPA FLORIDA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Europe & North Africa	1030-1330 (1)* 0700-1430 (3-4) 1430-1530 (1-2)	0500-1200 (2-3) 1200-1600 (3-4) 0600-1930 (1-2)	1700-2200 (3-4) 2200-0300 (2-3)	1800-2330 (3)
Central & South Africa	1000-1500 (2-3)* 0730-1300 (1-2) 1300-1630 (3)	0100-0230 (1-2) 0600-1300 (1) 1300-1600 (1-2) 1600-1930 (3)	1700-0100 (3)	1830-0030 (2)
South America	0800-1300 (2)* 1300-1800 (3)* 0700-1800 (3-4) 1800-1930 (2)	0600-1500 (2-3) 1500-2000 (4) 2000-0330 (2-3)	1700-0500 (4) 0500-0730 (3)	1800-0400 (3-4)
South East Asia	1830-1930 (0-1)	0630-0900 (1) 1700-2000 (1)	0300-0700 (0-1)	NIL

ALL TIMES IN EST

TAMPA FLORIDA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Australasia	1600-1900 (1)* 1500-2000 (2)	0700-1000 (2) 1400-1700 (1) 1700-2230 (2-3) 0200-0400 (1)	0130-0730 (3)	0300-0700 (2)
Japan, Okinawa & Far East	1630-1900 (2)	0700-0900 (1-2) 1530-2130 (2-3)	0100-0700 (1)	0200-0600 (0-1)

ALL TIMES IN CST

CHICAGO, ILLINOIS TO:	15 Meters	20 Meters	40 Meters	80 Meters
Western & Central Europe	0900-1230 (2)	0630-1300 (2-3) 1300-1430 (3-4) 1430-1630 (1-2)	1630-1930 (3) 1930-0300 (2)	1800-0100 (2)
Southern Europe & North Africa	1030-1200 (0-1)* 0700-1330 (2-3)	0600-1200 (2-3) 1200-1430 (3-4) 1430-1730 (1-2)	1630-2000 (3-4) 2000-0200 (1-2)	1800-0030 (2-3)
Central & South Africa	1200-1500 (1-2)* 0630-1300 (1-2) 1300-1600 (2-3)	0600-1300 (1) 1300-1600 (1-2) 1600-1900 (2-3)	1730-0030 (2-3)	1830-2330 (1-2)
South America	0800-1200 (2)* 1200-1600 (3)* 0630-1400 (3) 1400-1700 (4) 1700-1900 (1-2)	0600-1500 (2) 1500-1830 (3-4) 1830-2300 (1-2) 2300-0230 (2-3)	1800-0600 (3-4)	1900-0430 (2-3)
Japan, Okinawa & Far East	1400-1700 (1-2)	0700-0930 (1-2) 1300-1700 (1) 1700-2100 (2)	0100-0800 (1-2)	0200-0600 (1)
South East Asia	1500-1830 (1)	0700-1000 (1) 1500-2000 (1)	0230-0800 (1)	NIL
Hawaii	1400-1600 (1-2)* 1100-1900 (3-4)	0900-1030 (2-3) 1030-1700 (1-2) 1700-2100 (3-4)	2100-0300 (3-4) 0300-0800 (2-3)	2200-0700 (3)
Australasia	1500-1800 (1)* 1430-1900 (1) 1900-2100 (2)	0700-1000 (3) 1000-1700 (1) 1700-2100 (2-3)	0100-0730 (2-3)	0130-0630 (1-2)

ALL TIMES IN CST

SAN ANTONIO, TEXAS TO:	15 Meters	20 Meters	40 Meters	80 Meters
Europe & North Africa	0700-1330 (2-3)	0600-1200 (1-2) 1200-1630 (3) 1630-1730 (1)	1730-0200 (2-3)	1900-0100 (1-2)

80 Meters: Night time propagation conditions to many areas of the world improving as static levels decrease on this band. This band is forecast to open for DX from a few hours after sunset to a few hours before sunrise. Short-skip openings should be possible around the clock with daytime skip between 50 and 300 miles and night time skip distances between 250 and 2400 miles.

160 Meters: DX conditions poor to fair at best but improving as static levels and summer time ionospheric absorption decrease. If the band opens for DX at all it will be during the hours of darkness approximately the same times as shown in the *Charts* for 80-meter openings. Daytime propagation will be limited to about 50 miles because of severe ionospheric absorption. During the night time hours short-skip should be possible from about 50 miles to distances greater than 1500 miles.

This overall picture of band conditions is intended to indicate qualitative changes in each band from month-to-month. For specific times of band openings for a particular circuit, refer as usual to the *CQ Propagation Charts* on the following pages.

Sunspot Cycle

General sunspot activity during the Contest period is expected to be higher than during any similar period since 1951. The sunspot cycle continues to increase at a rather rapid pace with the predicted smoothed sunspot number centered on October, 1955 as 32. The observed monthly Zurich sunspot number for June, 1955 was reported as 33.1. This resulted in a smoothed sunspot number of 12 centered on December, 1954. Refer to last month's column for a graphical presentation of the trend of the present sunspot cycle.

WWV

At the present stage of the art, long range forecasting of ionospheric disturbances is possible with only a limited degree of accuracy. Since ionospheric disturbances have a tendency to repeat themselves every 27 days, especially during the present part of the sunspot cycle, it is possible by carefully observing daily radio conditions during August and September—then projecting ahead 27 or 54 days—to obtain some idea of what the daily ionospheric conditions might be during October. The accuracy of this type of forecast is limited by the fact that not all disturbances repeat themselves, and there is no way of predicting when a new disturbance cycle may begin. From an analysis of this type it appears that the phone section of the Contest, October 22nd to 24th, falls during a period of stable ionospheric conditions and radio conditions should be fair to good. The CW period, October 29th to 31st, will begin somewhat erratic with conditions only fair, but improving to fair to good by the end of the Contest period. A more up to date forecast for this period and the month of October as a whole, appears in the Last Minute Forecast section of this column.

Up to the minute ionospheric forecasts during the contest period can also be obtained from the National Bureau of Standards radio stations WWV and WWVM. Short term forecasts for North Atlantic circuits are transmitted on WWV (2.5, 5, 10, 15, 20 and 25 Mc.) in International Morse Code at 19½ and 49½ minutes past each hour throughout the day. New forecasts are issued at 7 AM, Noon, and 6 PM EST. The forecast consists of a letter and a number group. The letter "N" indicates conditions at time of issue are normal; the letter "U" that conditions are unsettled or erratic and the letter "W" that conditions are disturbed. The number indicates the average quality of conditions for the forecast period as follows:

1—useless	5—fair
2—very poor	6—fair to good
3—poor	7—good
4—poor to fair	8—very good
	9—excellent

For example a forecast of "U6" indicates that present conditions are erratic but that overall conditions during the forecast period will be fair to good.

Similar forecasts for North Pacific circuits are transmitted over WWVN (5, 10 and 15 Mc.) at 9 and 39 minutes past the hour after the time announcement and the station identification. The North Pacific forecasts are issued daily at 10 AM and 6 PM PST.

In the event that an ionospheric disturbance develops during the Contest period, remember that not all circuits are adversely affected. Those paths passing through or near to the auroral zones are most affected and may actually "blackout" entirely, but on the other hand North-South paths from the USA to South America, South Africa, Australasia, etc. are not usually adversely affected and during certain types of disturbances conditions have actually been observed to *improve* on these circuits. During ionospheric disturbances therefore, concentrate on working the North-South circuits as predicted in the *Charts*, with many East-West openings also possible, depending upon the severity of the disturbance. When East-West paths open during disturbed conditions signals are much weaker than usual, erratic in signal strength and subject to considerable fading.

[*Continued on page 115*]

DX

Gathered and reported by

R. C. "DICK" SPENCELEY, KV4AA

Box 403, St. Thomas, Virgin Islands.

Of late we have been noticing increasing latin-american phone activity well within the CW portions of the 14 megacycle band.

It is well known that many foreign countries have no frequency limitations for the use of phone transmissions within the ham bands and stations of these countries have a perfect legal right to such transmissions.

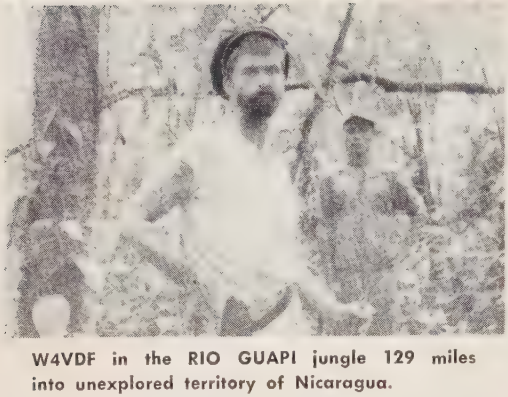
The incompatibility of phone versus CW on the same frequencies has long been recognized and has resulted in an "unwritten law" or "gentlemans agreement" that phone transmissions be kept off the much used CW frequencies.

Most foreign hams recognize the benefits of such voluntary action, both from a phone and CW viewpoint, and have cooperated in a manner which symbolizes true ham spirit.

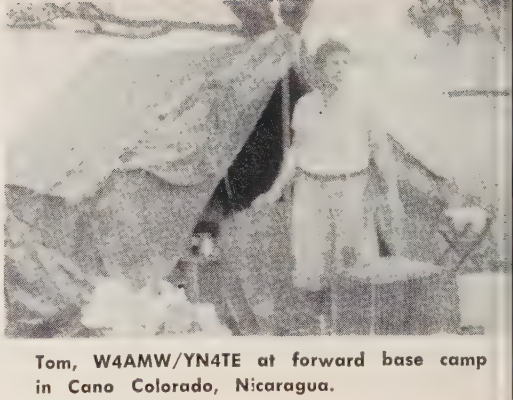
It is probable that the allotment of only 100 kilocycles in the 14 Mc. band for the thousands of U.S. phone stations was made so that W phone QRM would not push foreign phone farther and farther into the portions of this band used for C.W. This has left a full 100 kilocycles for foreign phone (14150-14200 and 14300-14350) on frequencies where no U.S. phone QRM will be encountered plus, of course, foreign use of 14200-14300. In view of this we think the encroachment by foreign phone into the overloaded portions of the band used by CW is quite unnecessary and unfair.

Failure of legislation in foreign states in allotting specific phone frequencies appears shortsighted as chaos would certainly result should phone and CW be used indiscriminately on all ham band frequencies should the majority of foreign phone stations decide not to cooperate in the manner in which they have been doing. Indeed, we think that phone frequency allocations should be decided upon at international radio conferences. Phone and CW on 14 Mcs. IS a world-wide affair and such

Active on all bands is DJ2YL, Susi Liebig, of Braunschweig, Germany. DJ2YL runs from 100 to 200 watts and antennas range from a 400 foot long wire to a two element rotary beam for 21 Mcs.



W4VDF in the RIO GUAPI jungle 129 miles into unexplored territory of Nicaragua.



Tom, W4AMW/YN4TE at forward base camp in Cano Colorado, Nicaragua.

signals are not confined, of course, to the country of origin.

Thus we make this plea to foreign radio clubs to ask those few members, who inconsiderately use whatever frequency they wish for phone, to cooperate with the belief that such cooperation will benefit both themselves and their brother hams towards better communications.

DX Notes

YASME-CQ DX'PEDITION, VP2VB/P: Danny and the Sloop YASME left St. Thomas August 1st on the next step of his globe-circling trip. In spite of the presence of hurricanes Connie and Diane, to the north, he encountered eleven days of dead calm which forced him to run his main engine for the greater part of the trip. Arriving in Cristobal on August 13th, with but one inch of gas remaining in his last tank, he was met by KZ5EM and KZ5LB. Danny will spend four to five weeks in the Canal Zone completing final preparations for his Pacific hop and, as this is read, should be well on his way across.

BASUTOLAND, ZS8L: Henry, ZS1PD, signing ZS8L, was heard in contact with W4TO, 14040, 1300 GMT. Thus his vacation trip to ZS8-land came off OK. Activity was confined to the 7 and 14 Mc. bands, VFO controlled, with a power of 100 watts.

ASCENSION ISLAND, ZD8AA: Tom should have completed his studies, successfully we hope, and ZD8AA should be heard again around mid-October.

BHUTAN, AC5PN: Many W6's were heard calling this station (QRS) near 14080, 1300 GMT. ZL1BY reports him on 14095 around 1400 GMT.

FRENCH TOGOLAND, FD4BD: This station has been active on 14024, 2230 GMT, giving his name as Pierre and QTH as Lome. We believe him to be ex-FD8AB who also operated on that QRG.

ANDORRA, PX1EX/P: This expedition, operated by Messrs F8EX, F8EO, F3IB and F9UK was first heard on the air at 0700 GMT, August 8th. made many contacts during their week of operation. QSL go via REF. CONGRATULATIONS!
Bob, YU1GM, worked Yves, PX1YR, July 21st on 14162, A3. PX1YR reported he has his new beam in operation and was very pleased with it.

NEW HEBRIDES, YJ1DL: Dave has been active again from this QTH on CW, 14010 0600 GMT. He loaned his modulation transformer to the local BC station so is presently confined to CW operation.

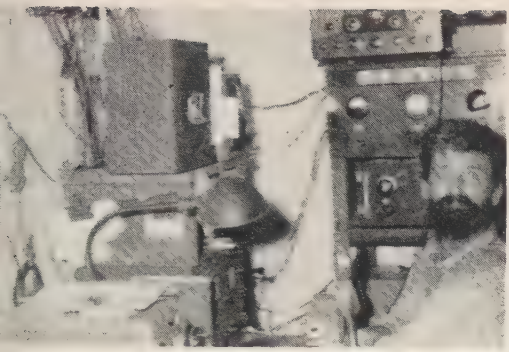
BRITISH NORTH BORNEO, ZC5SF: After a six months vacation in G-land ZC5SF is back on the air again with better gear and QRI. VK4YP reports contact with him on 14015 at 0730 GMT.

TRUCIAL OMAN, MP4QAL: Fergus is back on the job at Halul Island which now counts as Trucial Oman.

FANNING ISLANDS, VR3B: Activity from this station was reported by W3WV who was his QSO No. 2, 14078 kc at 0345 GMT.

DX Items

Via the West Gulf Bulletin we hear that **KAØIJ** (Iwo Jima) will return stateside shortly and no one will take over the operation of his station. **ZD9AD** will be on soon from Gough Island with G3HPM at the key. All bands will be worked 1.8 through 21 mcs. ZD9AD will be wih an expedition sponsored by the British Government. **VS9AW** is now VS1GR (For QSL purposes). **ZB2A** is returning to G-land leaving **ZB2I** active in Gibraltar. **VS9AF** Aden is being worked by the East Coast boys A1 and A3. VS1CZ reports that **AC5PN** gets on 14100 daily at 0700 and 1900 Indian Standard Time. He worked his first W on July 23rd. **JZØAG** is on every Wednesday starting around



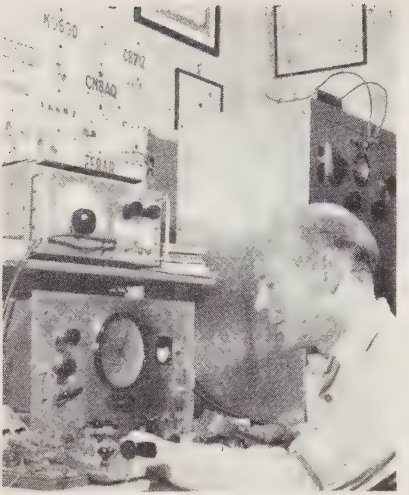
Seen above is Capt. Buck Brown, W4VDF/YN4BB, operating from YN4CB at the close of the Brown-England animal hunting Expedition last April/May. Buck with Tom England, W4AMW/YN4TE, penetrated 120 miles into unexplored Nicaraguan territory in the Rio Guapi area.

100 GMT until the band fades, 14081. **/K1ZM** is now on from Macquarie with QRP, 14100, A3, 1830 to 0530 GMT. **VK1DC** s also on A3, 14150, and hears W's best round 0300 GMT. . . . Len King, **VK9OK,** Norfolk Island, will spend another year at that QTH before returning to Australia. He is ooking for G QSO's. . . . ON4QX was not ble to join the Himalaya expedition. Peter arries on from **ON4QX/AC4** but the going s very difficult. Pete has contacted only two V's W8QJR and W5CFG. They QRT at the nd of September. . . . News from VQ4RF dvises that the trip of **VQ4NZK** to the Sey- helles has been again cancelled as they are tarting new picture. . . . W9WCE says the all of **WØWLO/SV2** is being pirated in his rea. . . . W1FH nabbed **XW8AB** on 14060 t 1308 GMT. XW8AB has also been heard ear 14010 around 1800 GMT. It appears that Laos, Cambodia and Viet-Nam should all ualify as separate countries under their present et-up. The ban has only been lifted on Laos owever. . . . W5CFG got a QSL from **HV1VD** saying that he runs 3 watts from Vatican City. This one and **HV2AB,** QSO'd y W3MFW, seem doubtful however **HV2AB** ays QSL via G3KLM. . . .

DX'ploits

Starting off the list again is Chas., W1FH, who added **XW8AB** for 262. . . . Close behind is Marv, W6VFR, who ups his CW total to 259 with **ZC3AC**, FW8AB and **PX1EX/P** while going to 186, A3, with **VS4CT** and **VS5CT.** . . . Jayme, PY2CK, ascends to 256 with **PJ2MA** and **ZD8AA** and leads the flock by wide margin on "phone only" by hitting 239 thanks to VS4CT, VS5CT, ZD8AA and PJ2MA. . . . Andy, W6ENV, grabbed PX1EX/P for No. 256 as Walt, W6MX, made it 253 with XW8AB. . . . Al, W8PQQ, goes to 252 with VS4CT, PJ2MA and XW8AB as Howy, W2AGW, ups to 251 thanks to XW8AB. . . . Pierre, F8BS, our new WAZ submits **VP2GRO** for No. 234 while Vince, W5KC, comes up with a long list of additions moving him from 195 to 232. . . . Ozzie, W9VND, also comes up to date going from 178 to 210 while ZS2AT submits new list setting him on 192. . . . Clay, W6LGD, hits 178 with **YJ1DL** as Hal, W6BUO, adds such as **HKØAI,** YJ1DL, **JZØPS, KJ6BG** and **EA9AP** to reach 167 . . . Vip, W6ID, snagged XW8AB for No. 164 while Bill, W5ASG, takes a commanding lead in the 39 zone group by adding XW8AB and PX1EX/P for 251! . . . Glenn, W8KIA, thanks to XW8AB, is second among the 39 zoners with 246 while Art, W9LNM, adds ten to hit 234. . . . Roy, VK4FJ, makes it 218 with XW8AB as Joe, W8UAS, goes to 219 with XW8AB and PX1EX/P. . . . Gus, W2HMJ, coming up fast, adds **MP4QAL, ZD6BX** and **KC6CG** for 212 as Eric, OZ7BG, goes to 183 with such as **W6OXS/VP2, JZØAG, VR2CG, ZA4KBA, VK9AU** and **VQ6LQ**. . . . Sam, W3AXT, sets on 176 with help from **VK9RM,** MPQAL and KJ6BG as Maurice, W3WU, goes to 169 with **EA9DF, TI9MHB,** HKØAI, **9S4BN, FG7XB** and **ST2NG**. . . . Smitty, W9FNR, reaches way back for 41 additions to reach 156 as Jim, W5FXN, goes to 177 with **I1DCO/M1**. . . . In the mike and modulator department Guy, W6DI, adds HKØAI for 212 while John, W4HA, pulled in **MP4BBV, YI2AM** and VS4CT to reach 191. . . . Mike, YV5AB, A3'ed to 169 with **YU1CY, VQ5EK, KS4AW, HKØBX, M1B** and **KC4AB**. . . . VP3VN,

Doubling in a BC capacity VP2DA is shown broadcasting a debate on the West Indies Federation issue. At the mike is Acting-Administrator Mr. Josse, standing by the transmitter is Acting Gov't Sec'y Mr. Hugh Grell, VP2DH, at the transmitter controls is missionary Merritt Hoath, VP2DL, and at the tape recorder is Bill Burbrook, VP2DA.



SM7QY, Karlskrona, Sweden, manned by Gunnar Ekstrom recently acquired WAZ Certificate No. 308. He runs 150 watts to ground plane and dipole antennas. The receiver is an 11 tube super-het. Gunnar's country total stands at 182.

14079, was No. 121 for Dave, W1WAI, while ZD3A made it 157 for Fred, W5AVF. . . . Recent contacts by John, W3UXX, include **HH9A, PJ2CT, GD3IYS, TF2WAF, VP2BM, LZ1RB, HR2AD,** and **HA7KLD**. . . . K2GFQ goes to 160 with such as **HB1OP/HE, LX1DZ,** VK9RM, ZD3A, VQ6LQ, **VR2BZ, SU1IC, ZD8AA** and **VP5DC**. . . . Steve, K2CJN, miked with **KC6CG, KW6BD, KAØIJ, KX6BU, KG6NAA, TA3US, KJ6FAA,** TF2WAH, **KG1FR** and **HZ1AB** to reach a 116 total. . . . Frank, W1WY, dropped his power down to 3½ watts input and was still readable at ZL2AFZ. He also has cards for his WAE II. . . . Joe, WØQZR, running 60 watts make a running start towards DXCC with CO2FC, XE1MB, PY5VF, VQ6LQ, KL7TI and PJ2AV. . . . Down TI2BX way great events are shaping, but let me give it to you in Ted's own words: "One night in June, after 21 mc. had folded for the night, XYL Ginny was tuning idly around between 14.1 and 14.2 and announced that she sure was tired of TI2BX being stuck at 99 worked; further, that since it seemed improbable that I would do anything about it unless the DX all

Our heartiest congratulations to the following station upon his achievement of WAZ:
No. 309 F8BS PIERRE BONICHON 40-234
an overdue pasteboard from UAØKFD did the trick!

Dx Flash

ZS2MI showed up on 14157, Aug. 2. and worked W6UHA, W6AOA, W6M. W6BUD and W6FSJ . . . I1DCO hopes to another performance at **I1DCO/M1** in the f future . . . W6LJQ makes a six month Europ trip, starting in September, and hopes to pu some time at **SVØWU,** Rhodes, and poss Crete . . . Via W6BUD we hear that En W6KQY, and XYL Marion, W6LNP, H been touring Europe in a Volkswagon o combination business and pleasure trip . **FO8AK** will be active from RAPA for the three years . . . F9RS reports that **FB8** Kerguelen, will be active on 7 and 14 M starting September 1st while **FB8ZZ** can heard on 7 Mc. around 1430 GMT. **FB8** is on Tromelin again but not very ac **FB8AX,** Adelie Land, Antarctica, should heard this Winter. The FC prefix for Cor will be "official" very shortly. (Listen FB8XX between 1800 and 1900 GMT) HB9OP planned operation from **HB1OP/** during the WAEDC tests . . . Da **VP2VB/P,** has been given the call of KZ5 instead of KZ5DX as previously mentioned should depart from Balboa, on his Pacific around September 25th . . . **HB1KU/HE** active for 3 weeks, in August, from Liech stein . . . Ferfus, **MP4QAL,** was due to m from Halul to Bahrein on August 29th. He probably sport a new MP4 call . . . A s DX'pedition of two or three HB hams headed by HB9KB plan to be on the air f **Monaco** for about two weeks starting Oct 6th. The call will be issued after their ar there. Operation will be on all bands but clusively on CW. QSL's go via USKA . . . QTH for W4ML, who handles **FY7YE** c is: Tom Stuart, RT-1, Box 310, Norfolk, . . **VQ4FM** is ex-VP8AA . . . Dave, **YJ1** writes that he is on again, 14005, but is with commercial traffic which has trebled s their air service quit. He says that **ZC3A** an Indian and a good CW man and hope persuade him to be on more often . . . West Gulf Bulletin advises that **VR3B** is replacement for **VR3A** and may be found 14070 around 0400 GMT. QTH: Deane L c/o Cable and Wireless Ltd., Fanning Is via Suva, Fiji . . . **OX4XX** is a new F Island ham and has been heard on 14048, GMT. QTH: Box 195 Torshavn . . . Via W we hear that **GB3GP,** A3, 14137, is a sp call issued for a limited time to the Internati Ice Patrol near Iceland. QSL via RSGB . . . VS1CZ, **AC5PN** is on daily, 14100, 0700 1900 Indian Standard Time . . . **XZ2AD** i regularly, CW, around 1500 GMT on 14 (QRS) . . .73's KV4AA.

ught KW's and rhombics, danged if SHE sn't going to try. Since I believe in en-ıraging the young people in worthy en-ıvors whenever possible, I fired her up on ,150 and turned her loose. She worked **8BA** just by way of getting her hand in, :n swung the beam WSW and really opened . In less than two hours (0400/0600 Z) she ɔceeded to knock off KAØIJ, VK9BG, G6SB and then, to show me what she :ALLY could do if she tried, nabbed **t6AC,** no less! This only goes to show what ıı can do with 130 watts and a two element am, PROVIDED you also have a nice con-lto voice, good conditions and the privilege working outside the 14.2/14.3 maelstrom heterodynes and splatter!! Since then, in :er self defense, I have added another, a

(Photo courtesy North California DX Bulletin)

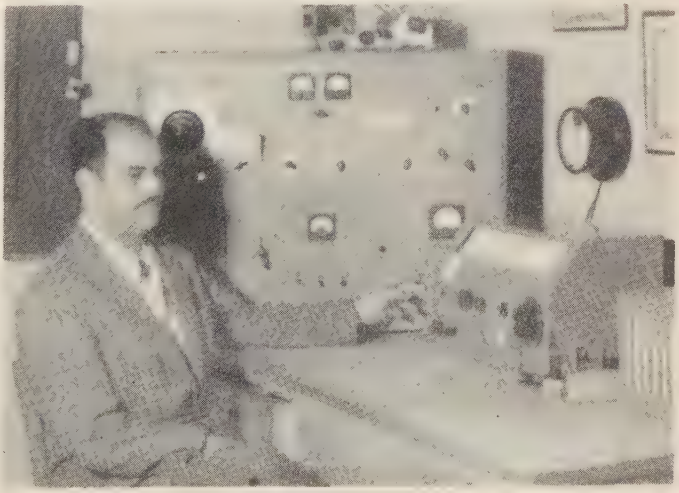
W6GPB, Joe Horvath of San Rafael, Calif., needs no introduction. On the air since 1932 the present rig consists of PP 4-250A's modulated by 810's class B. Driving the KW final is a B & W 5100. Joe's country total stands at 197.

CT3, so we now stand at the dizzy eminence of 105 worked and about 75 confirmed———" . . . Recipients of the new WAVKCA Certificates were: No. 1 W6YY, No. 2 ZL1BY and No. 3 KH6PY (W6GBG). . . . W7AHX nabbed his 40th zone with **FB8BR** giving him 190 countries while K6ENL, XYL of W6LGD, goes to 77 with **I1BNU/T, ZB1JRK,** and **YU3IE**. . . . Late DX at DL4ZC includes VP5DC, **FC7GE, ZP5AY, CR4AL, YS10** and **OQ5BT**. . . . Chas., W5TFZ, added PJ2AE, JA3AF, HR1RL and **YV1AI** as Hal, VE3IG, goes to 110 with **YO2VM, HB1OP/HE** and **OY7ML**. . . . Jim, W9WWJ, nears the century mark with such as **HHØA,** T19MHB, **FY7YF, FP8AP,** I1CZE and DM2ADL. . . .

Here and There

W7DZO is on again with a Kw after a year off. . . . W6VEM ponders **X1NP** claiming to be on a ship near VK. Name is Fag and a BC-610 is used. This guy has popped up many times over the last few years and has admittedly borrowed that callsign Irv. . . . Manuel, XE1SA, is studying with Remington Rand in N.Y. and is no longer XE QSL manager. He expects to be on again from XE1SA in early November. Manuel says **XG6AX** is a big hoax and the prefix XE4 is no longer in use. . . . W8OPG ponders one **LB1RC** who gave his QTH as South Georgia and said QSL via NRRL. . . . W3YIV/4 advises further regarding the calls PJ2MA/PJ2MB which were used some time ago. These calls were unauthorized and used, by a Swedish citizen, as maritime mobile only. . . . Bill, W2UKS/MM, wishes it known that he is QRV for the gang and DX aboard the Great Lakes SS. North American. Bill runs 50 watts to a Lettine 240 rig on all bands A1/A3. John, W9QQG, is his 3rd Radio Officer and helps with the DX'ing. . . . Jim, **YN1AA,** expects to be on shortly with his Heathkit DX-100 on all bands including 160. He will probably put the

[*Continued on page 116*]



PY3QX, Cruz Alta, Brazil, shows operator Elon Castro in the operating position. An 813 is run at 150 watts to an 3.5 Mc. doublet. Receiver is a double superhet, 13 tubes, with Select-o-Jet built in.

NOVICE

Reported by

Walt Burdine, W8ZCV
RFD 2, Waynesville, Ohio

Dear Readers of The Novice Shack:

From the comments received by letter, in person and on the air, I am just beginning to think we are getting started, possibly in the right direction. However, I would like to say, how far we go and where, will depend upon the governing body of NOVICE SHACK, *YOU*. I feel quite a few of you have said, "I'd like to see" or "Wait'll I write" or possibly "if he'd put that in there" or may be, "If I were editor I'd" . . . . . I know you can write and YOU are the editor. You know that what I write depends a good deal upon what you want written. I'll do my part, YOU? The reports from the technicians are few and far between. I've used all the letters received and an article for the technician is in the mill. Last month I said I was writing the column blind, but, no more. I have received letters from 31 states and five countries. There were plenty of ideas in those letters. Keep them coming and tell me what you want, eventually you will see it in CQ. Thank all of you for helping.

I have received three letters from school teachers that put me to thinking. They have formed radio clubs in their science departments and have graduated a group on novices and a few general class licensees. In this age of science and scientific survival it behooves each on us to interest as many potential scientists of future generation to study and scientific rese as possible. Almost every device that we today has had an electronic specialist's han its development. The stone age has passed ago, each so-called age has lasted for a lenium, yet in my short life I have lived in electronics age and lately I hear the t "atomic age" used quite freely. Really atomic age can't exist without the electr scientist, so, I suggest we call this the "e tromic age", a marriage of the two. So, for vival in the electromic age we must have sc tists, and plenty of them too, good ones. I k of no better training ground for the future sc tist to cut his wisdom tooth than in the fiel ham radio. Ham radio operators develo healthy interest in scientific research and velopment. As a future scientist the bud student ham should get as much mathem study as he can absorb, it will come in handy later in life. The ham of today is scientist of tomorrow. Those teachers and t radio club members are helping to make world a safer, finer and more stable plac which to live and to keep it free.

There is a tendency of some hams of

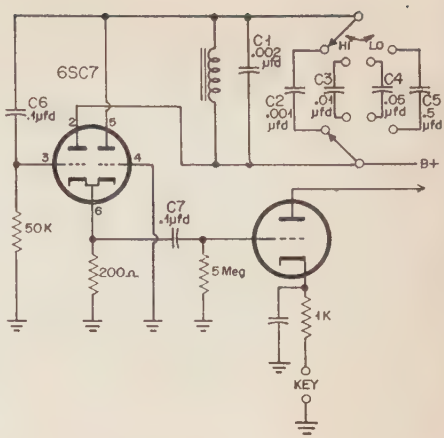
The Swampscott High School Amateur Radio Club, Swampscott, Massachusetts. Left to right, Tom Eickelberger, W1UNA, Industrial Arts Instructor (club advisor), Temple Fay, WN1EUT, Joe Francis, WN1EUU, Mat Slobin, W1ZBH Dom Spinale, WN1ETL, Robert London, WN1ETW and Robert Sherin, W1ZHG. Picture courtesy Lynn Item Newspaper, Lynn, Massachusetts.

novice and technician rank to feel inferior to the general class. If you, as a novice or technician, get the idea that you aren't important, just read the excellent editorial by John W. Campbell, W2ZGU, on page 13 in the July issue of CQ. This article states the importance of the ham in the field of radio better than any I have ever read. I fear too many people fail to read the editorial page of any magazine, there's good reading there.

The novice grade license was created to act as an aid in the training of the future general class licensee and to make learning the code easier, because by using the code to talk to some one, you will just naturally improve in sending and receiving as the fellow ham can offer criticism and advice. I really hate to lose you from the novice ranks but I sure wish you the best of luck in getting the general license.

Code Oscillators

Getting an operator's license requires a certain amount of practice in studying the code. You can learn to read (copy) code by listening to your receiver, but to learn to send you must have a code oscillator. This code oscillator is an electronic device that generates an oscillation within the audio range (20 to 20,000 c.p.s.). Breaking the oscillating tone into pulses of long and short durations of sound is our method of forming the code characters. In this way we are able to create a method of communicating with others knowing the code. With code (C.W.) we are able to communicate with peoples with lingual differences by using the Q signals. The Q signals mean the same in all languages.



C1—.002 µfd. disc ceramic.
C2—.001 µfd. disc ceramic.
C3—.01 µfd. disc ceramic.
C4—.05 µfd. tubular
C5—.5 µfd. tubular
C6—.1 µfd. tubular
C7—.1 µfd. tubular

Fig. 1. Crosby oscillator.

As I have said before, learning the code is a matter of practice, practice and more practice. I would suggest that you use a loud-speaker to listen to the code while practicing. Many aspirants fail the code test because they have practiced with phones and then take the test with a speaker. You might use phones part-time while practicing to keep peace in the family.

I've spent a good many hours looking up diagrams of code oscillators for my friends who were either unable to locate them or too lazy. Here are some diagrams for you to use. A brief description of the circuit components is also

DX is good on 15 meters for Bill Bruning, KN6IYJ, Long Beach, California. Bill is 15 and surely works the DX with this layout.

Ohio is DX to Melvin Ohara, WH6BIF of Hilo, Hawaii. Melvin works only 40 meters because of lack of coils for the Millen 90800.

included. Audio oscillators can be used for code practice, as a cw monitor to check keying, for furnishing a tone for using M.C.W. on two meters and as an audio signal to test audio amplifiers. To use an audio oscillator for learning the code a method must be devised to open and close the tone generator to form the characters of the code. This device is the telegraph key.

Circuit Discussion

The diagram shown in figure 1 is the two terminal Crosby oscillator. The output from the cathode feeds into the input of an audio amplifier. The key can be inserted in the cathode of the first audio amplifier tube or in the voice coil lead to the speaker. The tone can be controlled by switching in condensers of different values. The iron core inductance is a small AC-DC choke or the winding of a small transformer.

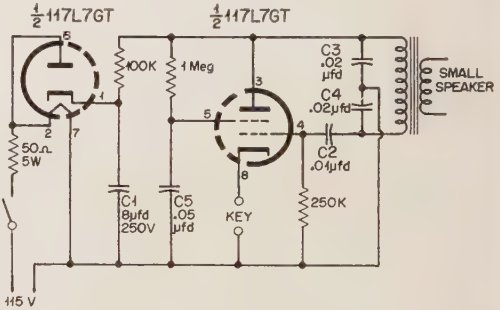
The phase shift oscillator of figure 2 is a very stable oscillator and can be used for many audio applications requiring an oscillator with these qualifications.

The circuit of figure 3 is widely used for code oscillator units. Variations of this circuit, either the tapped coil (Hartley) or the tapped condenser (Colpitts) are used in practically all the commercially available code oscillators.

The oscillator shown in figure 4 is the grounded plate Colpitts oscillator using tapped condensers across an iron core inductance. The iron core inductance is a small choke, primary of an ouput transformer or a toroid coil. The frequency can be changed by changing the capacitors, keeping near the same ratio. Phones or a small speaker can be used in series with the B plus lead. An audio amplifier can be used with the oscillator by using resistance coupling to the first stage.

The oscillator of figure 5 uses the inductance of a pair of high impedance (not crystal) headphones as the inductance. The key can be put in the cathode lead.

The multivibrator oscillator circuit of figure number 6 is a very valuable circuit to become



C1—8 µfd. 250 volt.
C2—.01 µfd. disc.
C3—.02 µfd. ceramic
C4—.02 µfd. ceramic
C5—.05 disc.
All resistors 1 watt except as noted.

Fig. 3. Tapped oscillator.

acquainted with and you should at least be on speaking acquaintance with this circuit. The tubes may be any twin triode or two similar single triodes. *C* will determine the frequency of oscillation, both condensers should be of the same value. The value should be any value from .01 to .1 µfd.

The oscillator shown in figure 7 is the tickler feed back oscillator and is the simplest code oscillator that has been built here. The transformer is the smallest, cheapest input type transformer that you can buy. You may have to put a condenser at *C* to lower the tone to suit your ear. You can experiment with this value, start with about an .005 µfd condenser.

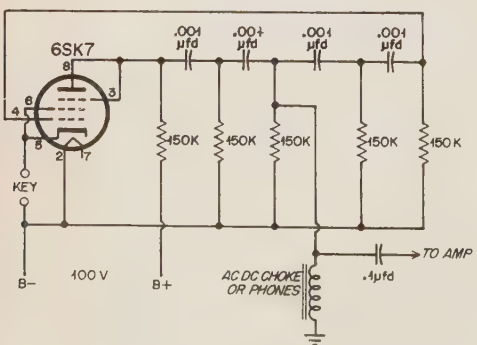


Fig. 2. Phase-shift oscillator.

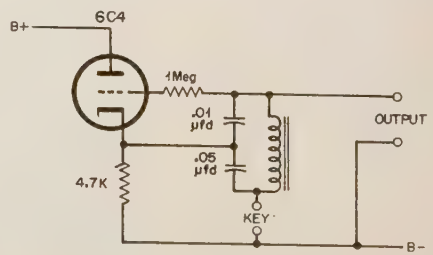


Fig. 4. "Grounded"-plate Colpitts.

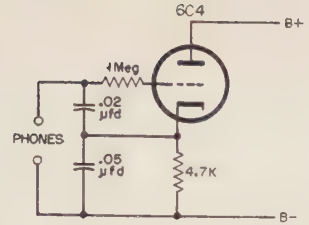


Fig. 5. For inductive headphones only.

The tube may be any small battery triode type such as the 1H4G, 30, 1G4G or any small subminiature type. If the oscillator doesn't work try reversing the leads in the primary of the transformer. The phones must be of the magnetic or dynamic type as the plate current flows through them.

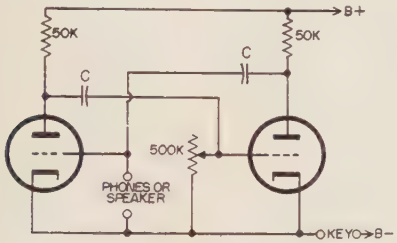


Fig. 6. Multivibrator oscillator.

A transistor type code oscillator was planned but we didn't have time to build it up so it will appear in a future issue.

If you aren't a ham, build a code oscillator and get busy. If you are a novice or technician, build one to use as a C.W. monitor and get on C.W. and get that general. Good luck.

Getting on the Air (Continued)

Continuing our discussion of choosing the proper band and related subjects of discussion we will continue from our last column.

Bands:

The 3.7 mc. band is best for consistent local (300-500) mile communications day or night. A good deal of fun can be had here, but the QRM is bad, especially in the summer-time. This is a very popular band and this in itself contributes to the QRM. One disadvantage of this band is the large physical size of the antenna required. Direct crystal control, without the necessity of multipliers, simplifies construction of equipment. Good DX can be worked on this band with low-power and good antennae during the long winter months. One ham, running less than 100 watts has over 100 countries on C.W. He is an excellent operator and does considerably more listening than transmitting.

The 7.0 mc. band is a very popular band for both local and DX contacts during both day and night. Good antenna, rather than power will aid you in working plenty of DX on this band. Good clean keying and careful operating cannot be stressed too much in operating any band. Direct crystal control is possible on this band. Editor's note: Effective June 22, 1955 the F.C.C. extended the novice portion of this band to 7150 to 7200 kilocycles. Antennae for this band can be constructed on a city lot.

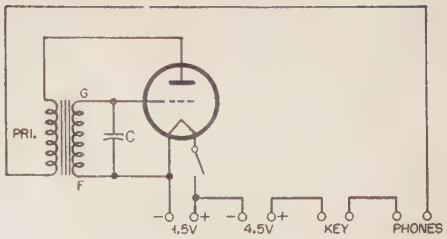


Fig. 7. Feedback oscillator.

The 21.0 mc. band is erratic in operation and this in itself is one of its attractions. This lack of reliable operation makes its consistent use unattractive to many, but lots of DX can be worked on this band if it is used correctly. Direct crystal control can be obtained on this band but is usually obtained by using 7.0 mc. crystals and tripling the frequency electrically. Beam antennae can be built for this band and their use aids the working of DX on this band with low-power. You should plan to include 21.0 mc. in your operating agenda.

The 145 mc. band is the only novice phone band and is to be highly recommended to the novice living near the large, thickly populated areas. These areas usually have enough V.H.F. activity to warrant the expense of building a two meter transmitter and receiver. Naturally anyone living fifty or more miles away from a city having plenty of V.H.F. activity would be ill-advised to limit his operation to two meters. This does not mean that he can't have plenty of QSOs on this band. With a good converter and a good antenna coupled to a 25 or 50 watt transmitter you can make plenty of contacts up to about one hundred miles with an occasional long distant contact to add spice to your ham menu. The small physical size of antennae for this band makes the construction of multi-element beams for this band a commonplace practice. 24 or 32 element beams for two meters can be bought for about thirty dollars. Height of the two meter beam adds db to the signal almost as fast as increasing power. Crystal control on this band can be obtained by using low frequency crystals and multiplying the frequency electrically. The writer has 17 states and 970 miles on the two meter band with a 60 watt transmitter and a ten element beam 40 feet high. The QRM on this band is not bad except at the few times of a band opening and then it is welcomed. The two meter

band is four megacycles wide with two megacycles assigned to the novice. Let's fill those megacycles with some signals.

Letters To The Editor

This is a well condensed version of a letter from Mike Wenninger, W9ASK, 513 Forest Avenue, River Forest, Illinois. This letter has quite a bit of good advice in it. "Dear Walt: The age here is 17. I have been a ham for two years and came up thru the novice ranks. I finally made WAS last April, am a member of R.C.C., and an A.R.R.L. Official Observer. I have been reading the Novice Shack for three years and think it is one of the best departments in CQ. The equipment I use is a Bandmaster Senior, an NC-125, a Heathkit VFO and various doublets and folded dipoles. I have never run over 50 watts input and I'm never planning on going over 250 watts. High power just makes it nice for a few and hard on the many. You make two meters sound like a lot of fun and maybe one of these days I'll climb up there and see for myself, but first I'll have to get the DX blood out of me. I forgot to mention that I operate CW almost exclusively. I wish you lots of success and in my opinion you are holding up the tradition for Novice Shack editors. 73. Mike."

From Ken Kindy, WN8CML, R.F.D. #2, Box 1566, Battle Creek, Michigan: "Dear Walt: I have had my novice license for three weeks. For the first two weeks I didn't make one contact due to some trouble in my antenna. So far I have worked 24 states and all call areas in the U.S.A. in five days. The transmitter is a 6AG7-6146 combination and the receiver is an NC-98. Oregon is my best DX. 73. Ken."

Ray McClure (16), WN8CNL, 112 Kirkpatrick, Battle Creek, Michigan writes: "I have had my license twelve days and have made 46 contacts in 8 states. I have a Heathkit AT-1 running about 30 watts. The receiver is also a Heathkit set. I don't know why, but I can't seem to get into Indiana. I have most of the states around Michigan and would sure like to make a sked with some one in Indiana. My best DX is Kansas. The antenna is a forty meter dipole, although at present I am working on 80 meters I am going to put up an 80 meter dipole too, but I think 40 meters will be my favorite ban 73. Ray."

Barry Joseph (16) WN7ZSE, 4542 East 20 Street, Tucson, Arizona writes: "I have bee on the air for about two months with an AT- The receiver is an S-38 and the antenna is long wire. I would like some information on vertical for the forty meter band that wou match the AT-1. I work 40 meters most of t time. I will sked any one needing Arizona f WAS. All cards and letters will be answered. 7 Barry."

Roy S. Goldsmith (16) W3WAF, 549 Ne comb Street S.E., Washington, D.C. say "Dear Walt: I am a very regular reader of t Novice Shack, in fact it is the first article read when I get the magazine. I would like make a few suggestions to the WN/KN boy First, I think that when the novice contacts 'General class amateur' they can speed up over 5 wpm. I know from experience that gets sort of tiresome for us to sit and copy or 6 words per minute. Next, since the novi band has been expanded, I have listened c the new frequencies, but the novices still cl ter around the old frequencies, using the ne allotted frequencies would cut down the QR considerably. I still use the same rig that had as a WN3, a Harvey-Wells TBS-50 ru ning about 40 watts. The receiver is an S-40 and the antenna is an Amphenol folded dipo The folded dipole ended all my many anten troubles, as I live in an apartment and do have too much space for antennae, I final made my WAS in April and am now trying f WAS novice. I would like to make a sked wi any WN/KN7. I have worked most of t other states on the novice bands. I will sked a QSL 100% anyone wanting a D.C. statio The telephone here is JO-2-4933. 73. Roy

Bill Bruning (15) KN6IYJ, 3746 Le Avenue, Long Beach 7, California hits anot sore spot. He writes: "Hi Walt: I want to s that I enjoy reading the Novice Shack ve much and enjoy reading all about the gu rigs and things. The rig here is 50 watts t Johnson "Adventurer", and the receiver is SX-71. I enjoy using it very much going af that choice DX. I work 40 and 15 mete every day. The crystals on 40 are 7188 a 7157. On 15 my frequency is 21.198 mc. listen on 15 on the weekends. There is go DX there and more of the novice gang sho work 15 and find out how the DX piles u MY ONE GRIPE, IS THE HAMS TH DON'T QSL YOU. Of course it takes a wh for the calls to come out in the callbook, b when they get our card, I think they sho send one in return. 73. Bill."

Bob Jones (14) KN5AUZ, 3211 Grays Street, Fort Worth, 5, Texas says: "D Walt: I am interested in 15 meters, I wish lot of the fellows were. If more hams w interested in 15 meters, that band would of

Coil data for the 15-meter converter omitted from the September issue (excuse, please!):

L1—3 turns #24e wound on ground end of L2.
L2—15 turns #24e close wound on ½ inch diam. slug-tuned form.
L3—15 turns #24e close wound on ½ diameter slug-tuned form.
L4—23 turns #26e close wound on ½ inch slug-tuned form.
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					3749

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7153	7161	7169	7177	7185	7193
7154	7162	7170	7178	7186	7194
7155	7163	7171	7179	7187	7195
7156	7164	7172	7180	7188	7196
7157	7165	7173	7181	7189	7197
7158	7166	7174	7182	7190	7198
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2060 2455 2595 2835 2975 3150 3700 4340 4845 5437 5 5900
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6600 7000 7366.7 7516 7
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6675 7075 7541.7

7658 3 7758 3 7858 3 7958 3 8066 7 8163 4 8266 7 8366 7 8470 8575 8675
7660 7760 7860 7960 8070 8166 7 8270 8370 8473 3 8580 8680 3
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7670 7770 7870 7970 8075 8173 3 8275 8380 8480 8590 8690 7
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Complete with reduction Gear Box; reduces to approx. 60 R.P.M. Motor Rating 110/220 V AC 60 Cycles, 1725 R.P.M. ¼ h.p. BRAND NEW Wt. 80 lbs. **$29.95**

SWINGING CHOKE: 5—25 henry. 550 MA. Brand New. Ship. Wt. 19 lbs. Ea. **$8.95**

FILTER CONDENSER: 4 Mfd. 1500 VDC, Each. Brand New. Wt. 3 lbs. **$1.95**

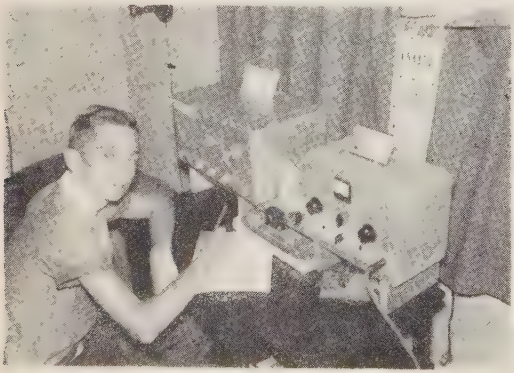
NOTE: Min. order $2.50. Check postal zone, add sufficient postage. Items weighing more than parcel post limit (20 lbs.) will be shipped via rwy. express or motor freight collect.

The Radio Club of Orange, Virginia says partners in business are rivals on the air in the person of Giff, KN4DCL and Bert, KN4DCN. They, with Wade, KN4DCO operate a jewelry business.

good DX to all. I have just finished a 15 meter antenna, as my 80 meter half-wave antenna didn't work out very good. The rig here is a Johnson Viking Adventurer and an S-38-A. I also have a homebuilt transmitter. I got help from W5FZF in studying for the license and he gave me the test. I will be glad to sked anyone that needs a KN5. 73. Bob."

Bill Clay WN1CWO, Harbor View Terrace, Stonington, Connecticut writes: "F. B. Walt. Nice to see you heading the NOVICE SHACK. The rig here is a Heathkit AT-1 and an S-85, both doing FB. Not much DX worked here because I like to ragchew on 80 meters. I would like to sked some one with a DX-100. I enjoy ham radio because of people like WN1AXD and WN1CFT. 73. Bill."

Hunter Heath III, (13) KN5BGR, 1711 Avenue "Q" Lubbock, Texas writes: "Dear Walt: I want to make skeds with any one out of the state or anyone needing Texas for WAS. I QSL 100%. The transmitter is a pair of 1625s running about 60 watts. The receiver is a BC-342. I would like a penpal also, maybe a yl penpal. 73. Hunter."



Steve Jarrett KN4CFB of Asheville, North Carolina has worked 27 states and Hawaii with this AT-1 and NC-57-B combination. Hawaii is a long way from North Carolina.

John Gubermaid KN2LSX, 21 Arverne Terrace, Irvington 11, New Jersey tells what can be done with low-power and a simple receiver. "Dear Walt: I have been a novice for 6 months and have worked 231 contacts on 80 meter CW. I have worked 20 states. My rig is a Meissner running about 15 watts. The receiver is a BC-454 that KN2JXL let me borrow. The antenna is a half-wave end fed. 73. John."

Steve Jarrett KN4CFB, 143 Druid Drive, Asheville, North Carolina writes: "I have had my ticket for four months, in that time I have worked 27 states and Hawaii. My rig is an AT-1 and an NC-57-B receiver. The antenna is a 66 foot doublet fed with 52 ohm coax. I would like to make a sked with Maine, Vermont, New Hampshire, Indiana and Wisconsin to complete the states on the East side of the Mississippi River. QSL card is guaranteed. I will sked anyone needing North Carolina. 73 Steve."

Richard Mills, W7AMH, 615 West Alturas, Tucson, Arizona pens this: "Dear Walt: Welcome to novice shack. I'm ex-WN8OUM from Cincinnati, Ohio, age 22 and single. I'm not out of the ham game by any means. I just got my new Technician call, W7AMH, and will be on 6 meters soon. The rig is a 12AT7-6SN7 unit running 20 watts and the 6 meter converter is already to go. I would like to see a bandswitching receiver in CQ using one or two tubes that would cover 6-2-220 and 420. 73 Dick."

Melvin Ohara WH6BIF, 157 Alae Street, Hilo, Hawaii, writes to say: "I thought I would write to you since I have just passed my Conditional Class license. I would also like to remind everyone that I am now on from 1930 to 2400 HST almost daily on 7188 and 7196 kc. The best DX is Ohio. I would like to make skeds with any VE, XE or any WØ. I have not worked a WØ yet. I will also be glad to give more people their first Hawaiian contact, so anyone who wants one just write stating time, date and frequency. I can only work 40 meters because of the lack of coils for the Millen 90800. I would appreciate SWLs sending in reports of my signals, I QSL 100%. The Transmitter is a Millen 90800 running about 40 watts. Receivers are an S-38-C and an S-76. Yours truly, Melvin."

Bill Smith KNØCER, 811 Gaskill Drive, Ames, Iowa, sends A.R.R.L. Radiogram no. 1 to say: "Dear Walt: Yesterday I received my ticket. I only had to wait three weeks. My thanks go to Verne, WØHOE, who drilled the code into me and was also my first QSO. My station includes a Viking Adventurer 50 watt transmitter, A Hallicrafter S-85, and an S-38-

for a monitor. I do my transmitting and receiving on the same antenna, a 90 foot long wire running East and West. My frequency on 15 meters is 21.219 mc. I'd be more than happy to help anyone obtain their ticket. Best regards. Bill."

Help wanted in reverse is offered by R. O. Deck, 652 Second, San Bruno, California. Telephone Number JUno 3-1775. He writes: "Dear Walt: I'll be glad to help anyone in my vicinity, (Peninsula, San Francisco to San Jose) get an amateur license. My young daughter is a novice. 73. R. O. Deck."

Lew Wallace KN9AIU, Rossville, Illinois gives me some very good ideas for future articles in the Novice Shack and also this news item: "I teach science in the Rossville Public Schools and I have been a ham for about two months. We formed a club at school and have the following members, KN9AIU, thats me, KN9AIB Jim Prather, KN9AHB Jim Strawser, KN9AHV Marvin Beshears and KN9ASC John Green. There are three more on the way. We were helped a lot by Charley Davis, W9OKL of Hoopeston, Illinois. The club rig is a Walter Ashe rig running about 25 watts and we work out very well. We got a big kick out of working WN9LYG of Waynesville, Illinois. He is 71 years old and a real sharp operator too. We will have a phone/cw rig in the school when one of us gets a general class license. The little Knight kits for the Ocean Hopper Receiver is a swell outfit for beginners and I am using one to copy W1AW for code practice. 73. Lew."

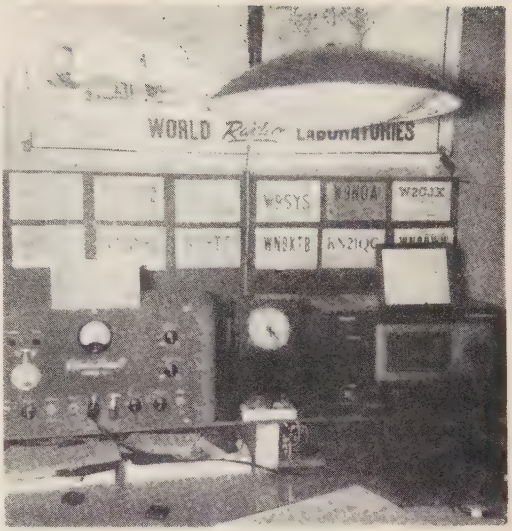
Warren A. Wolff WN5KKW, State College, New Mexico says: "I was licensed February 17th. 15 meters is my main interest with 40 second. I have worked 34 states and 4 countries. I have some troubles in QSL delivery and in case some of my contacts have not received my QSL, I will send another card in an envelope. 73. Warren."

Next mail brought another letter that says: I am now W5KKW. Warren.

John Axline WN8SUB, 7229 Greenleaf Ave., Parma, Cleveland, Ohio writes: "I was given the two meter bug by Bob, ex-W8QPW, now in W2 land. I recently built a crystal controlled converter and am having some trouble. I would appreciate some help from a local or two. I took my technician exam last week and am waiting to hear from the F.C.C. 73, John."

A nice letter from Dale Campbell (15) KN6LSL, 107 Francisco Drive, South San Francisco, California says: "The rig is a Johnson Adventurer running 50 watts to a 62 foot folded dipole. The receiver is an S-38-C. I have worked 35 contacts and 2 states on 40 meters. I love to write and will answer all letters received. 73, Dale."

Henry Schneider WN5HNS, 1743 Elms Street, Lake Charles, Louisana, says: "What, no letters from Louisiana? I am running 25 watts to a Heathkit AT-1 and the receiver is an NC-174. I am using a 40 meter doublet.



Jim O'Connell, W9JZK, 4224 Bobolink, Skokie, Illinois is looking for you on 15 meters with this nice layout and says "no N in the call now."

Since January, I have worked 32 states. All of my contacts are on 40 and 15 meters. I would like to sked West Virginia, South Carolina and any W7. I will also sked anyone needing Louisiana for WAS. 73, Henry."

Help Wanted

Mike Drake (15), 208 Caldwell, Goodland, Kansas. Telephone: 6194. Mike needs help in code and theory. He also would like to hear from SWLs interested in Ham radio.

Charles L. Paddock (24), 149 Stewart Road, Masury, Ohio. Telephone: Sharon, Pennsylvania 88364. Charles needs help in code and theory.

Joe Caberlin (21), 30 Beech Street, Sudbury Ontario. Joe is just out of the army and needs help on the theory.

Donald E. Simonsen (23), Mountain View Cabins, Cabin no. 5, Fairplay, Colorado. Got interested while in the army and is just recently discharged. Needs help mostly with the code and some theory.

Peter Blais (15), 4846 St. Lawrence, Montreal, Ontario. Telephone: MA.3313. Needs help on code and general information.

David L. Crook (26), 485 Ridge Road, Navoto or Navato, California. Telephone: Twinbrook, 2-3573. David needs help in code and theory.

Weston Wolff, 1111 Garnet Drive, Odessa, Texas, needs help on getting a license. Any correspondence will be appreciated.

[*Continued on page 114*]

1954 World Wide DX Contest CW Single Operator Score

United States

All Band

W1ODW	55,955
W1RST	360

3.5 Mc

W1RWP	589
W1WY	99
W1ODW	28

7 Mc

W1ODW	550
W1WMH	16
W1RST	6

14 Mc

W1JDE	28,160
W1ODW	18,976
W1LLQ	2,730
W1HOL	1,728
W1AWE	1,651
W1RST	273

21 Mc

W1ODW	6,240

28 Mc

W1ODW	192

All Band

W2WZ	302,175
K2EDL	59,343
W2EQS	37,050
W2AZS	24,174
W2GKE	7,316
W2KTF	3,243
W2SDB	2,337
K2EVH	360
W2LYL	154

3.5 Mc

W2SAI	8,736
W2WZ	1,548
K2EDL	1,124
W2EQS	304

7 Mc

K2EDL	30,294
W2WZ	10,778
W2HSZ	6,768
W2OTC	3,080
W2EQS	1,560
W2CAG	266
W2SDB	195
W2KTF	90
K2EVH	56
W2LYL	48

14 Mc

W2SUC	87,210
W2WZ	72,105
W2BBV	38,220
W2AZS	19,720
W2EQS	4,816
W2TXB	4,080
W2GKE	3,827
W2DTL	2,574
W2KTF	2,242
W2QKJ	1,653
W2SDB	1,144
W2YPQ	260
K2EVH	132
W2LRJ	130
W2PAU	40
W2CVW	36

21 Mc

W2WZ	18,675
W2EQS	2,697
K2EDL	881
W2GKE	552
W2PZI	338
W2AZS	176
W2LYL	30

28 Mc

W2EQS	81

All Band

W3JTK	134,232
W3KVD	92,787
W3KDP	70,152
W3OCU	51,198
W3EIV	40,128
W3FMJ	28,260
W3NCF	8,127
W3AEL	6,102
W3HVM	3,431
W3YIV	1,020

3.5 Mc

W3EIS	1,440
W3OCU	728
W3JTK	588
W3FMJ	110
W3KDP	72
W3VKD	42
W3EIV	42

7 Mc

W3MSK	35,945
W3JTK	23,725
W3EIV	7,420
W3POE	5,337
W30CU	4,230
W3VKD	1,747
W3KDP	1,500
W3HVM	520
W3FMJ	88
W3NCF	48
W3AEL	15
W3YIV	12

14 Mc

W3LOE	119,574
W3JTC	82,720
W3VKD	23,530
W3OCU	20,368
W3FMJ	20,128
W3KDP	18,354
W3VRJ	8,151
W3NCF	6,765
W3ADZ	6,678
W3AEL	5,390
W3FMC	4,116
W3ANZ	2,325
W3EIV	1,952
W3HVM	1,269
W3YIV	806

21 Mc

W3JTK	12,978
W3VKD	7,399
W3KDP	6,384
W3EIV	3,880
W3MDO	144

28 Mc

W3VKD	63

All Band

W4KFC	308,812
W4HQN	298,100
W4YHD	121,290
W4NBV	25,579
W4JAT	19,166
W4JBQ	6,732
W4BTO	3,483
W4GF	2,109
W4BYJ	851
W4YZC	704
W4DXL	648
W4HJK	266

3.5 Mc

W4HQN	1,735
W4KFC	1,551
W4YHD	285
W4HJK	4

7 Mc

W4YHD	18,825
W4HQN	14,204
W4KVX	13,862
W4KFC	13,130
W4BTO	1,800
W4NBV	1,161
W4JAT	273
W4YZC	176
W4BYJ	88
W4GF	72
W4BXV	45
W4ZOK	8
W4DXL	8
W4JBQ	4

14 Mc

W4KFC	58,092
W4HQN	50,406
W4HYD	26,643
W4JAT	14,518
W4NBV	11,607
W4JBQ	6,240
W4GF	1,392
W4VRT	897
W4BYJ	390
W4BTO	273
W4HJK	204
W4YZC	156
W4CVX	156
W4DXL	25

21 Mc

W4HQN	18,915
W4KFC	18,150
W4EEO	1,568

United States

W4YHD	726
W4DXL	300
W4CEB	210
W4NBV	192

28 Mc

W4KFC	48
W4HQN	32

All Band

W5ZD	48,910
W5CKY	11,907
W5KUJ	5,360
W5QF	4,998

3.5 Mc

W5ZD	236
W5CKY	76
W5QF	2

7 Mc

W5ZD	6,808
W5CKY	1,836
W5HPV	1,598
W5KUJ	72

14 Mc

W5KUJ	5,044
W5WQN	4,719
W5ZD	4,144
W5CKY	2,772
W5HDS	640
W5AWT	380
W5QF	78

21 Mc

W5QF	3,608
W5ZD	3,256
W5ZWR	726
W5CKY	2

All Band

W6ITA	215,058
W6RW	103,136
W6VUP	62,304
W6NZW	58,776
W6ALQ	50,976
W6BUD	33,088
W6ULS	21,903
W6MBA	15,820
W6NKR	15,708
W6QD	13,271
W6MGT	12,032
W6ATO	11,658
W6IPH	11,605
W6HJK	11,396
W6GWQ	11,152
W6CAE	10,988
W6MHB	10,752
W6TMX	10,422
W6HJ	7,581
W6BYH	7,381
W6ID	7,276
W6QPM	6,165
W6BIL	5,535
W6YC	3,990
K6DCE	3,910
W6EFV	3,901
W6QDE	3,026
W6EFR	2,135
W6EJA	546
K6BEC	285

3.5 Mc

W6BUD	588
W6ALQ	418
W6RW	338
W6ITA	187
W6GWQ	45
W6EFR	24
W6VUP	20
W6NZW	15
W6NKR	12
W6CAE	2

7 Mc

W6ITA	13,566
W6VUP	12,595
W6TKX	11,357
W6NZW	9,945
W6OYD	9,744
W6MHB	8,880
W6NKR	8,280
W6RW	8,225
W6QJI	8,096
W6ULS	7,525
W6ALQ	3,751
W6TMX	2,472
W6MGT	2,349
W6AIL	2,250
W6CAE	
W6IPH	
W6HJK	
W6ATO	
W6MBA	
W6UJ	
W6ID	
W6BYH	
W6QDE	
W6QD	
K6DCE	
W6YC	
W6EJA	
W6BUD	
W6BIL	
W6GWQ	
W6QPM	
W6EFV	
K6BEC	

14 Mc

W6ITA	
W6CUQ	
W6DZZ	
W6RW	
W6VUP	
W6ALQ	
W6EPZ	
W6NZW	
W6QD	
W6MBA	
W6BUD	
W6QPM	
W6FYM	
W6ATO	
W6MGT	
W6BIL	
W6CAE	
W6TI	
K6DCE	
W6EFV	
W6GWQ	
W6TMX	
W6IPH	
W6YC	
W6ULS	
W6ID	
W6BYH	
W6NKR	
W6QDE	
W6HJK	
W6EFR	
W6MHB	
K6BEC	
W6WNX	
W6EJA	

21 Mc

W6ITA	
W6BYB	
W6RW	
W6UED	
W6FUF	
W6HJ	
W6HJK	
W6NZW	
W6GWQ	
K6DCE	
W6BUD	
W6ALQ	
W6EFR	
W6ULS	
W6BYH	
W6ZPH	
W6ID	
W6EFV	
W6TMX	
K6BEC	

28 Mc

W6ITA	
W6RW	
W6EFR	
W6GWQ	

All Band

W7PQE	
W7DAA	
W7NLI	
W7AJS	
W7DYQ	
W7CNM	
W7QDJ	

3.5 Mc

W7PQE	

United States

W7NLI	323
W7AJS	210
W7QDJ	40
W7CNM	18
7 Mc	
W7ASG	11,350
W7PQE	5,032
W7JLU	3,146
W7NLI	2,548
W7DYQ	2,322
W7DAA	816
W7QDJ	589
W7CNM	516
W7AJS	374
14 Mc	
W7VY	33,268
W7HXG	15,300
W7PQE	14,934
W7DAA	12,035
W7AJS	10,556
W7PSO	8,904
W7DYQ	4,386
W7CNM	3,136
W7AC	1,768
W7NLI	1,392
W7QDJ	1,197
21 Mc	
W7AHX	3,744
W7NLI	1,100
W7QDJ	1,032
W7CNM	1,025
W7PQE	920
W7DYQ	312
W7DAA	2
28 Mc	
W7QDJ	12
All Band	
W8JIN	301,096
W8YIN	34,060
W8HHR	3,139
W8DAE	1,120
3.5 Mc	
W8AQ	680
W8JIN	660
W8YIN	160
W8DAE	40
7 Mc	
W8KIA	15,252
W8JIN	9,071
W8DAE	700
W8YIN	54
W8HHR	30
14 Mc	
W8BRA	84,180
W8JIN	69,795
W8STL	21,567
W8HMI	18,368
W8YIN	8,778
W8KC	1,540
W8NVJ	1,260
W8HHR	110
21 Mc	
W8JIN	21,321
W8YIN	3,150
W8HHR	1,568
28 Mc	
W8YIN	120
W8JIN	15
All Band	
W9HUZ	77,408
W9VUL	66,400
W9ABA	24,920
W9UKG	19,268
W9PNE	3,848
W9VOD	3,168
W9RKP	2,898
W9GWK	2,166
W9FKC	1,836
W9SZR	1,200
W9SDK	837
W9WJV	775
3.5 Mc	
W9HUZ	140
W9VUL	132
W9PNE	72
14 Mc	
W9FJB	36,603
W9HUZ	29,024
W9VUL	15,640
W9WKU	12,351
W9UKG	5,716
W9VOD	2,016
W9RKP	1,276
W9SZR	1,190

United States

W9FKC	966
W9PNE	882
W9GWK	525
W9SDK	306
W9WJV	6
7 Mc	
W9ABA	3,729
W9VUL	2,560
W9HUZ	1,860
W9UKG	680
W9PNE	456
W9RKP	323
W9FKC	132
W9SDK	48
W9SZR	30
W9WJV	12
W9FLE	5
W9GWK	2
21 Mc	
W9ABA	9,352
W9VUL	4,370
W9HUZ	1,485
W9GWK	465
W9WJV	435
W9VOD	108
W9SDK	27
28 Mc	
W9HUZ	12
All Band	
WØDAE	75,069
WØNWX	41,022
WØRSL	14,022
WØANF	10,624
WØOKH	9,600
WØYCR	7,168
WØQDF	2,772
WØGAX	2,014
3.5 Mc	
WØNWX	392
WØDAE	378
WØYCR	108
WØOKH	49
7 Mc	
WØNWX	3,451
WØDAE	2,964
WØGAX	1,080
WØQDF	900
WØOKH	435
WØYCR	432
WØRSL	238
WØANF	12
14 Mc	
WØDAE	24,682
WØAZT	9,747
WØANF	9,512
WØRSL	8,673
WØNWX	5,085
WØOKH	2,176
WØQDF	480
WØYCR	312
WØGAX	112
WØVFM	77
21 Mc	
WØNWX	882
WØDAE	800
WØOKH	504
WØGOE	210
WØQDF	120
WØYCR	78
WØRSL	63
28 Mc	
WØNWX	72
WØDAE	56

Germany

All Band	
DL1AU	310,128
DL1ED	110,500
DL4ZC	109,198
DL1JW	105,600
DL2RO	86,400
DL1BR	84,609
DL7AA	81,700
DL1BZ	65,608
DL7BA	64,548
DL6WD	54,991
DL1EE	48,760
DL1YA	42,951
DL7CW	39,555
DL7DF	38,775
DL1QT	38,080
DL3OC	34,444
DL1AO	30,780
DL4UZ	28,665

CW Single Operator, Cont'd.

Germany

DM2ABK	26,676
DL6DF	26,316
DL7AD	18,952
DL6XX	15,897
DL1IN	15,323
DJ2AE	13,968
DL7BO	9,439
DL9EY	8,103
DL1LZ	5,992
DL6RQ	4,836
DJ1KC	4,165
DL4WY	1,739
DL1EV	1,625
DL1QO	1,353
DM2ACM	1,026
3.5 Mc	
DL7CW	7,562
DL1BR	3,160
DL6WD	2,697
DL1BZ	2,520
DL1JW	2,464
DL1AU	2,044
DL3OC	1,742
DL1ED	1,728
DL2RO	1,653
DL6DF	1,638
DL1YA	1,540
DL4ZC	1,428
DL9EY	1,225
DL1AO	1,224
DL1QT	1,116
DM2ABK	806
DL7AA	748
DL7BA	720
DL4OZ	182
DL4WY	117
DL1QO	8
DL6RQ	2
7 Mc	
DL6MK	12,255
DL1AU	12,032
DL6MK	11,984
DL1ED	9,174
DL1JW	8,910
DL4ZC	5,760
DL7BA	5,593
DJ1BZ	4,830
DL3OC	4,560
DL7AA	4,268
DL2RO	4,040
DL1YA	3,952
DL7CW	3,864
DL1BR	3,306
DL6WD	3,255
DJ2AE	1,770
DL1QT	1,485
DL1EV	1,131
DL1LZ	988
DL4UZ	950
DL6DF	902
DM2ABK	780
DL6RQ	684
DL6XX	665
DL7BO	608
DL1IN	304
DL1AO	300
DL4WY	117
DL9EY	110
DM2ACM	25
DL7AD	25
DL1QO	12
14 Mc	
DL1AU	51,624
DL4OR	42,705
DL4CZ	31,735
DL1EE	30,880
DL1BR	15,680
DL1JW	14,634
DL1QT	14,328
DL2RO	14,204
DL1ED	14,040
DL6WD	13,750
DJ1BZ	12,852
DL7AA	12,208
DL4UZ	10,648
DL1AO	8,159
DL6DF	7,008
DL7AD	6,480
DJ2AE	5,670
DL7CW	5,265
DL1IN	5,120
DL4IQ	4,060
DL3OC	3,740
DL1YA	3,680

Germany

DL7BA	3,441
DM2ABK	2,738
DL7BO	1,860
DL1LZ	1,320
DM2ACM	486
DL9EY	208
DL6RQ	110
DL6XX	77
DL1IQ	72
DJ2HI	48
DL1EV	36
DL4WY	21
21 Mc	
DL1AU	25,308
DL1EI	14,824
DL1DX	12,474
DL7BA	8,470
DL6XX	7,301
DL7AA	6,300
DL1ED	5,712
DL2RO	4,872
DL1BR	3,168
DM2ABK	2,856
DL1JW	2,848
DL7AD	2,673
DL1EE	1,924
DL1YA	1,710
DL7BO	1,176
DL1IN	1,092
DL6RQ	945
DL1AO	882
DL9EY	864
DL7CW	576
DJ1BZ	455
DL1QO	405
DL3OC	300
DL4CZ	231
DL4WY	216
DL4UZ	168
DL1LZ	72
DL6DF	48
DM2ACM	24
DL6WD	12
28 Mc	
DL6XX	24
DL1JW	3
DL1YA	3

Alaska

All Band	
W6PZ/KL7	17,336
KL7AWB	17,160
KL7FAF	9,108
KL7RZ	2,320
3.5 Mc	
KL7RZ	98
7 Mc	
W6PZ/KL7	1,674
KL7FAF	684
KL7RZ	88
14 Mc	
W6PZ/KL7	7,826
KL7BBY	5,450
KL7BAK	5,348
KL7FAF	4,704
KL7RZ	588
28 Mc	
KL7RZ	12

Algeria

FA8DA	177,828
FA3OA	38,799
3.5 Mc	
FA8DA	6,386
7 Mc	
FA8DA	18,216
FA3OA	1,674
14 Mc	
FA8DA	12,200
FA3OA	2,829
21 Mc	
FA8DA	9,019
FA3OA	5,883
28 Mc	
FA3OA	12

Azores

All Band	
CT2BO	7,910
3.5 Mc	
CT2BO	4
7 Mc	
CT2BO	1,440
14 Mc	
CT2BO	2,304

Angola

14 Mc
CR6CJ 10,922
CR6CS 9,390

Anglo-Egypt Sudan

All Band
ST2AR 55,335
7 Mc
ST2AR 3,705
14 Mc
ST2AR 24,232

Antarctica

All Band
LU1ZT 46,971

Argentina

All Band
LU5DDF 15,075
LU2RD 3,753
7 Mc
LU2RD 9
14 Mc
LU5AQ 26,000
LU3HR 5,160
LU5DDF 4,900
LU2RD 420
21 Mc
LU3EX 73,710
LU5DDF 4,320
LU2RD 1,076

Australia

All Band
VK2GW 90,882
VK3XK 30,256
VK2PV 17,538
3.5 Mc
VK3AHH 462
VK2GW 20
VK3XK 4
VK2PV 4
7 Mc
VK2GW 9,620
VK3XB 3,304
VK3XK 3,285
VK2PV 896
14 Mc
VK2GW 20,882
VK5HT 17,543
VK3XK 8,738
VK2PV 7,406
VK3HL 7,185
VK3CX 6,916
VK3KB 2,372
VK7RT 1,387
21 Mc
VK2GW 2,384
VK2PV 152
XK3XK 144

Austria

All Band
OE5JK 173,336
OE3SE 19,992
OE1WH 14,820
OE3VP 9,702
OE6RP 1,170
3.5 Mc
OE5JK 1,820
OE3SE 1,034
OE6RP 156
7 Mc
OE5JK 4,578
OE1WH 1,980
OE3VP 1,320
OE3SE 720
OE6RP 154
14 Mc
OE5JK 53,246
OE2SP 21,900
OE1WH 5,952
OE3VP 3,864
OE3SE 1,944
OE6RP 84
21 Mc
OE5JK 2,738
OE3SE 1,421

Bahama Is.

All Band
VP7NG 21,949
VP7NM 16,224
3.5 Mc
VP7NM 182
7 Mc
VP7NG 6,162
VP7NM 1,736
14 Mc
VP7NG 4,830
VP7NM 3,427
21 Mc
VP7NM 104

Belgium

All Band
ON4UK 8,514
3.5 Mc
ON4UK 224
7 Mc
ON4UK 130
14 Mc
ON4CK 15,879
ON4QX 5,236
ON4UK 858
21 Mc
ON4UK 1,220

Belg. Congo

All Band
OQ5GU 151,900
OQ5CP 86,880
7 Mc
OQ5GU 5,600
OQ5CP 720
14 Mc
OQ5GU 39,627
OQ5RA 30,051
OQ5CP 28,652
21 Mc
OQ5GU 12,544
OQ5CP 8,096
28 Mc
OQ5CP 2

Bermuda

All Band
VP9BM 56,924
3.5 Mc
VP9BM 333
7 Mc
VP9BM 5,604
14 Mc
VP9BM 2,822
21 Mc
VP9BM 7,316

Brazil

All Band
PY1ADA 43,332
PY1RW 27,300
PY4IE 25,848
PY1AZO 8,804
PY1LZ 2,467
7 Mc
PY1ADA 3,780
PY2BNX 2,646
14 Mc
PY7AN 83,808
PY5TH 16,104
PY1ADA 13,724
PY1ANR 6,900
PY1RW 3,520
PY1AZO 1,397
PY1LZ 493
PY4IE 234
PY4BR 221
21 Mc
PY4IE 17,920
PY1RW 10,640
PY1AZO 3,140
PY1LZ 1,974
PY1ADA 702

Canada

All Band
VE1ZZ 43,672
VE1EK 14,472
VE1CU 1,036
3.5 Mc
VE1ZZ 912
VE1EK 4
7 Mc
VE1ZZ 2,976
VE1EK 377
VE1CU 20
14 Mc
VE1ZZ 10,406
VE1EK 6,279
VE1HO 1,378
VE1CU 759
21 Mc
VE1ZZ 384
VE1EK 312
3.5 Mc
VE3IG 539
7 Mc
VE3AAZ 1,134
14 Mc
VE3IR 444
All Band
VE4RO 68,796
3.5 Mc
VE4RO 988
7 Mc
VE4RO 2,652
14 Mc
VE4RO 10,208
VE4PU 904
21 Mc
VE4RO 5,494
28 Mc
VE4RO 4
14 Mc
VE5RU 2,430
VE5PM 943
21 Mc
VE5TK 612
All Band
VO6U 16,016
7 Mc
VO6U 4
14 Mc
VO6U 13,068
All Band
VE7ZM 22,989
7 Mc
VE7ZM 918
14 Mc
VE7VC/7 26,532
VE7ZM 8,536
21 Mc
VE7ZM 774

Canal Zone

14 Mc
KZ5NB 780

Canary Is.

All Band
EA8BF 13,158
3.5 Mc
EA8BF 1,680
7 Mc
EA8BF 2,223
14 Mc
EA8BK 5,805
EA8BF 510

Chile

All Band
CE3AG 402,210
CE6AB 25,622
3.5 Mc
CE3AG 1,170
7 Mc
CE3AG 13,072
14 Mc
CE3AG 97,185
21 Mc
CE3AG 18,349
28 Mc
CE3AG 871

Cuba

All Band
CO8DL 18,920
7 Mc
CO8DL 4,778
CM7PT 318
14 Mc
CO8DL 5,106

Cyprus

21 Mc
XC4XA 19,492

Czechoslovakia

OK1MB 268,191
OK1HI 141,330
OK3IA 104,304
OK3DG 52,824
OK1AEH 23,300
OK1PI 22,908
OK1KTI 11,395
OK1KKR 9,150
3.5 Mc
OK1MB 5,115
OK3IA 4,836
OK1HI 4,212
OK1AEH 1,326
OK1KKB 120
7 Mc
OK1MB 26,4
OK1JX 15,5
OK1HI 9,3
OK1KKR 7,0
OK1KTI 6,8
OK1PI 5,3
OK1AEH 5,1
OK3IA 4,3
14 Mc
OK1MB 45,5
OK3IA 26,8
OK1HI 18,0
OK1PI 5,4
OK1AEH 1,9
OK1KTI 5
21 Mc
OK1HI 6,1
OK1MB 3,9
OK3IA 4
OK1PI

Denmark

All Band
OZ7BG 113,2
OZ2PA 71,5
OZ3PO 19,7
OZ2NU 5,0
3.5 Mc
OZ2PA 3,3
OZ2NU 2,7
OZ7BG 1,9
OZ3PO 1,3
7 Mc
OZ7BG 5,9
OZ2PA 3,1
OZ3PO 1,2
OZ2NU 3
14 Mc
OZ7BG 25,3
OZ2PA 4,1
OZ3PO 3,6
OZ7P
21 Mc
OZ2PA 7,4
OZ7BG 2,8
OZ3PO

Eire

All Band
EI9Y 34,1
EI9J 21,1
3.5 Mc
EI9J 2,
7 Mc
EI9Y 1
EI9J
14 Mc
EI9Y 21,
EI9J
21 Mc
EI9J 4,
EI4Q 1,

England

All Band
G6PD 140,
G4CP 101,
G3FXB 80,
G2VD 68,
G2AJB 22,
G3DOG 3
G4TM 1
1.8 Mc
G2AJB
3.5 Mc
G3HWF 6
G6PD 4
G3FXB 2
G4CP 2
G2AJB 1
G2VD 1
G4TM
7 Mc
G2LU 12
G8KP 9
G4CP 6
G3FXB 6
G6PD 4
G3GEN 4
G2VD 4
G2AJB 2
G3DOG 1
G3JVJ 1
G4XC
G4TM
14 Mc
G2LB 7
G6PD 2
G4CP 1

3FXB 8,964
2VD 8,560
3ITP 5,124
2AJB 936
4TM 162
3DOG 6
1 Mc
2BW 9,352
3DCU 8,360
6PD 4,600
5HZ 4,464
2VD 4,080
3FXB 3,977
4CP 3,081
2AJB 819
3DOG 360

Faeroes Is.

All Band
Y2Z 368
7 Mc
Y2Z 20
14 Mc
Y2Z 209

Finland

All Band
H2MQ 50,697
H1NK 41,603
H1PW 34,216
H3RL 14,137
H7NW 4,611
H1PN 2,462
H2YV 1,104
3.8 Mc
H2YV 20
3.5 Mc
H1PN 1,936
H2YV 798
H2MQ 768
H3RL 84
H1RX 48
H1PW 30
H7NW 15
7 Mc
H2ZE 6,439
H1NK 4,466
H2MQ 2,976
H1SM 1,632
H6QP 375
H3RL 360
H7NW 195
H1PW 4
H1PN 2
14 Mc
H2MQ 18,504
H3RA 14,941
H3RL 7,875
H1PW 7,700
H1NK 5,368
H2OJ 3,354
H7NW 2,415
H9OB 1,952
H3SS 1,539
H2KG 450
H3SE 49
H1PN 2
21 Mc
H1NK 4,080
H3NY 340
H2MQ 8
H1PN 2
28 Mc
H1PN 2

France

All Band
FBRM 64,665
FBOP 25,536
FBTM 15,300
FBCF 6,987
FBEP 6,237
FBXB 2,808
3.5 Mc
FBRM 3,379
FBOP 1,690
FBTM 1,512
FBCF 81
7 Mc
FBOP 3,010
FBRM 1,885
FBTM 960
FBEP 903
FBCF 450
FBXB 90
14 Mc
FBRM 13,364
FSOP 4,025
F8TM 2,388
F7CG 1,704
F7CF 1,350
F9EP 770
F9XB 740
F9RS 350
21 Mc
F9RM 1,104
F7CF 288
F9XB 234
F9EP 210

Fr. Equat. Africa

14 Mc
FQSAT 113

Fr. Morocco

14 Mc
CN8IE 115,230

Fr. West Africa

All Band
FF8JC 55,045

Hawaii

All Band
KH6IJ 178,932
KH6MG 145,375
KH6PM 102,684
KH6WW 4,992
3.5 Mc
KH6MG 14,448
KH6IJ 8,970
KH6WW 4,896
KH6PM 1,547
14 Mc
KH6IJ 107,536
KH6PM 44,982
KH6MG 19,565
KH6WW 96
21 Mc
KH6MG 6,578
KH6PM 4,598
28 Mc
KH6MG 42

Honduras

7 Mc
HR1JZ 684

Hong Kong

All Band
VS6AE 12,592
7 Mc
VS6AE 581
14 Mc
VS6AE 4,356
21 Mc
VS6AE 252

Iceland

All Band
TF3MB 26,175
TF3AB 8,624
7 Mc
TF3AB 330
TF3MB 88
14 Mc
TF3BG 54,736
TF3MB 10,458
TF3AB 5,016
21 Mc
TF3MB 1,840

India

All Band
VU2JP 33,480
7 Mc
VU2JP 266
14 Mc
VU2JP 6,713
21 Mc
VU2JP 6,120

Israel

All Band
4X4BX 597,065
4X4RE 497,896
4X4DE 371,346
4X4FW 54,834
7 Mc
4X4DE 60,204
4X4BX 38,024
4X4RE 27,456
4X4FW 13,002
14 Mc
4X4BX 75,012
4X4RE 67,396
4X4DE 42,780
4X4FW 14,227
3.5 Mc
4X4BX 14,000
4X4RE 6,180
4X4DE 2,583
21 Mc
4X4BX 31,049
4X4RE 22,736
4X4DE 8,892
28 Mc
4X4BX 24

Italy

All Band
I1ALU 103,342
I1TT 24,000
I1BUQ 19,527
3.5 Mc
I1ALU 1,272
7 Mc
I1ALU 4,608
I1IT 1,950
I1BUQ 247
14 Mc
I1BUQ 12,404
I1ALU 11,180
I1IT 3,520
I1SXZ 2,610
21 Mc
I1ALU 11,448
I1IT 2,522

Japan

JA3AF 61,054
JA1BI 24,624
JA3AA 21,060
JA4BB 8,010
JA1SR 2,573
JA2AA 2,544
JA1AB 1,640
JA1BC 1,526
JA8AQ 1,232
JA1AFF 352
JA1ACA 346
3.5 Mc
JA1AS 48
7 Mc
JA4BB 6,183
JA3AF 5,925
JA1BI 5,112
JA3AA 4,656
JA1BC 752
JA2AA 641
JA1AB 368
JA1SR 108
JA1AFF 30
14 Mc
JA3BB 22,152
KA3RR 20,230
JA6AD 20,041
JA3AF 17,342
KA2AS 15,529
KA3SV 9,275
JA1BI 7,227
JA7BO 3,808
JA7AD 3,625
JA4BB 2,793
KA2DS 2,262
JA3AA 1,764
JA1SR 1,625
JA2AB 1,620
JA1AB 432
JA2AA 405
JA1AFF 217
JA8AQ 210
JA1ACA 180
JA1BC 130
21 Mc
JA1CO 2,499
JA4BB 1,320
JA3AF 1,296
JA3AA 1,095
JA8AQ 504
JA1CJ 270
JA1ACA 24

Kenya

All Band
VQ4RF 157,312
14 Mc
VQ4RF 43,289
21 Mc
VQ4RF 34,980

Lebanon

All Band
OD5LX 144,250
OD5AV 80,085
3.5 Mc
OD5LX 230
7 Mc
OD5LX 11,616
14 Mc
OD5AV 50,400
OD5LX 35,812
21 Mc
OD5AV 3,420
OD5LX 2,352

Leeward Is.

All Band
VP2KB 2,574
7 Mc
VP2KB 590
14 Mc
VP2KB 696

Mexico

21 Mc
XE1PJ 56

Mozambique

14 Mc
CR7LU 6,845

Netherlands

All Band
PAØUN 140,748
PAØSPR 103,075
PAØTAU 99,940
PAØVB 65,485
PAØUV 23,859
PAØHJK 10,899
PAØWAC 10,556
PI1RRS 9,900
PAØHP 8,990
PAØQT 5,985
PAØZV 5,050
PAØRL 1,060
3.5 Mc
PAØGIN 6,055
PAØUN 2,848
PAØSPR 2,666
PAØHP 2,660
PAØTAU 2,449
PAØVB 2,117
PAØWAC 900
PI1RRS 874
PAØUV 735
PAØQT 494
PAØWKL 102
PAØRL 35
7 Mc
PAØGER 9,282
PAØUN 7,920
PAØSPR 6,125
PAØTAU 5,940
PAØNIC 5,805
PAØOI 4,879
PAØVB 3,081
PAØTA 2,492
PAØUV 1,274
PI1RRS 595
PAØQT 323
14 Mc
PAØSPR 22,470
PAØUN 19,575
PAØTAU 12,537
PAØVB 9,960
PAØUV 8,164
PAØZL 5,049
PAØWAC 4,502
PAØAGA 3,597
PI1RRS 2,070
PAØHP 1,829
PAØQT 1,350
PAØRL 1,104
PAØRZL 30
21 Mc
PAØKX 10,148
PAØUN 8,120
PAØTAU 5,460
PAØVB 3,367
PAØSPR 1,311

Neth. W. Indies

All Band
PJ2AA 62,238
PJ2AI 23,547
PJ2AJ 3,150
3.5 Mc
PJ2AA 450
7 Mc
PJ2AI 1,053
PJ2AA 864
PJ2AJ 135
14 Mc
PJ2AN 9,455
PJ2AI 6,264
PJ2AA 3,150
PJ2AJ 588

CW Single Operator, Cont'd.

21 Mc
PJ2AA 16,218
PJ2AI 1,672
PJ2AJ 351
28 Mc
PJ2AA 168

New Caledonia

All Band
FK8AO 33,618
3.5 Mc
FK8AO 10
7 Mc
FK8AO 1,350
14 Mc
FK8AO 14,584
FK8AE 613
21 Mc
FK8AO 480

New Zealand

All Band
ZL1BY 172,312
ZL2GS 89,890
ZL1MQ 73,350
3.5 Mc
ZL1BY 1,104
ZL1MQ 630
7 Mc
ZL1BY 13,788
ZL2GS 11,424
ZLM2MM 10,875
ZL3LL 9,287
ZL1MQ 2,640
14 Mc
ZL1BY 25,928
ZL1MQ 18,477
ZL3AB 15,314
ZL2GS 14,878
ZL2GX 9,234
ZL1ACO 4,809
21 Mc
ZL1BY 7,414
ZL2GS 4,608
ZL1MQ 1,469
28 Mc
ZL1MQ 120
ZL1BY 60

North Ireland

All Band
GI3IVJ 14,973
3.5 Mc
GI3IVJ 396
7 Mc
GI3IVJ 943
14 Mc
GI3IVJ 798
21 Mc
GI3IVJ 756

Norway

All Band
LA6U 25,833
LA3Y 11,560
LA7C 6,344
LA4ND 5,520
LA2Q 3,108
LA7KA 2,170
LA1RD 2,091
LA6FA 943
LA3LC 494
LA7AA 420
LA9T 320
3.5 Mc
LA6U 1,344
LA2Q 350
LA7C 176
LA3LC 42
LA1RD 2
7 Mc
LA6U 4,712
LA3Y 1,350
LA7C 832
LA7KA 195
LA2Q 108
LA3LC 78
LA1RD 72
LA6FA 2
14 Mc
LA6U 5,712
LA3Y 3,552
LA5QC 2,108
LA7C 1,455
LA1RD 1,271
LA6FA 840
LA2Q 703
LA7KA 175
LA3DB 96
LA9T 30
LA3LC 12
21 Mc
LA7KA 330
LA9T 150
LA3Y 81

Nyasaland

All Band
ZD6BX 12,597
7 Mc
ZD6BX 20
14 Mc **527**
21 Mc
ZD6BX 6,860

Okinawa

14 Mc
KR6PC 1,460

Pakistan

All Band
AP2K 95,000
7 Mc
AP2K 5,280
14 Mc
AP2K 19,110
21 Mc
AP2K 1,570

Peru

All Band
OA4C 36,220
7 Mc
OA3C 98
14 Mc
OA4C 8,910
OA4J 2,920
21 Mc
OA4C 3,638
28 Mc
OA4C 36

Philippine Is.

All Band
DU7SV 130,968
3.5 Mc
DU7SV 28
7 Mc
DU7SV 9,888
14 Mc
DU7SV 36,540
21 Mc
DU7SV 3,760

Poland

All Band
SP3AN 134,829
SP5FM 24,070
SP2BF 6,992
SP2GS 156
3.5 Mc
SP3AN 5,358
SP5FM 2,945
SP2BF 1,620
SP2GS 12
7 Mc
SP3AN 10,208
SP5FM 10,140
SP2BF 1,909
SP2GS 2
14 Mc
SP3AN 15,572
SP2GS 56
21 Mc
SP3AN 3,441

Portugal

All Band
CT1DJ 98,980
CT1AH 1,488
3.5 Mc
CT1DJ 616
7 Mc
CT1DJ 4,433
CT1AH 140
14 Mc
CT1CO 34,574
CT1DJ 4,488
CT1AH 646
21 Mc
CT1DJ 21,412

Puerto Rico

All Band
KP4JE 127,942
KP4CC 80,465
KP4KD 50,052
KP4TF 26,928
3.5 Mc
KP4TF 1,008
KP4CC 533
KP4JE 300
KP4KD 126
7 Mc
KP4JE 16,544
KP4CC 7,548
KP4KD 3,885
KP4TF 405
14 Mc
KP4CC 14,536
KP4TF 12,502
KP4JE 7,310
KP4KD 2,244
21 Mc
KP4JE 11,868
KP4KD 10,229
KP4CC 2,600
28 Mc
KP4JE 168

Rhodesia No.

All Band
VQ2GW 39,200
VQ2AS 4,655
7 Mc
VQ2GW 3,059
VQ2AS 8
14 Mc
VQ2GW 4,602
VQ2AS 4,185
21 Mc
VQ2GW 5,364

Rhodesia So.

All Band
ZE3JO 18,836
7 Mc
ZE3JO 9
14 Mc
ZE5JA 36,846
ZE5JE 1,652
ZE5JH 780
ZE3JO 546
21 Mc
ZE3JO 10,912

Rio De Oro

All Band
EA9DF 149,490
7 Mc
EA9DF 20,358
14 Mc
EA9DF 59,280

Roumania

All Band
YO3RF 133,860
YO3FT 16,200
YO6AW 12,975
YO3CM 546
YO3CA 247
3.5 Mc
YO3RF 1,950
YO6AW 780
YO3FA 80
YO3CA 12
YO3CM 10
7 Mc
YO3RF 13,969
YO3FT 4,743
YO6AW 448
YO3CA 143
14 Mc
YO3RF 14,427
YO3GY 6,006
YO6AW 2,820
YO3CM 407
YO3FT 232
21 Mc
YO3RF 6,930
YO6AW 56

Saarland

All Band
9S4AX 40,713
3.5 Mc
9S4AX 3,927
7 Mc
9S4AX 2,538
14 Mc
9S4AX 2,415
21 Mc
9S4AX 1,254

Sardinia

All Band
IS1AHK
7 Mc
IS1AHK
14 Mc
IS1AHK
21 Mc
IS1AHK

Saudi-Arabia

All Band
HZ1HZ
7 Mc
HZ1HZ
14 Mc
HZ1HZ
21 Mc
HZ1HZ

Scotland

All Band
GM3DPK
3.5 Mc
GM3DPK
7 Mc
GM3DPK
14 Mc
GM3DPK
21 Mc
GM3DPK

Sicily

All Band
IT1TAI
7 Mc
IT1TAI
14 Mc
IT1TAI

Spain

All Band
EA1AB
EA1CP
EA5AE
EA3CY
EA3FU
EA2CR
EA1CS
EA4CR
3.5 Mc
EA1AB
EA1CP
EA2CR
EA5AE
7 Mc
EA1AB
EA3CY
EA1CP
EA3FU
EA5AE
EA1CS
EA2CR
EA4CR
14 Mc
EA1BC
EA3GF
EA1AB
EA5AE
EA1CP
EA3CY
EA3FU
EA1CS
EA2CR
21 Mc
EA1AB
EA1CP
EA3CY
EA5AE
EA2CR
EA4CR

Sp. Morocco

All Band
EA9AP
3.5 Mc
EA9AP
7 Mc
EA9AP
14 Mc
EA9AP
21 Mc
EA9AP

Sweden

All Band
SM5AQW
SM4BTB
SM6ID

CW Single Operator, Cont'd.

3M4BCE	21,384
3M3BIZ	14,784
3M3AKM	14,534
3M3ACP	10,143
3M3AF	8,456
3M3BNL	8,040
3M5AHL	7,808
3M5WC	4,830
3M4KL	4,740
3M6AJN	3,337
3M7BVO	3,216
3M7BHF	3,195
3M5BRO	3,100
3M5TL	2,948
3M6VY	2,847
3M7AOO	1,750
3M5CCE	1,700
3M6JY	1,586
3M6PF	864
3M6CED	822
3M7BY	595
3.5 Mc	
3M5AHK	5,148
3M5AQW	3,328
3M6JY	1,140
3M4BCE	1,005
3M4BTB	768
3M6ID	737
3M6VY	480
3M4KL	468
3M5CCE	408
3M6CED	304
3M3AKM	304
3M6PF	208
3M7AOO	198
3M6AJN	169
3M3BIZ	143
3M6BDS	42
3M7BY	42
3M5BRO	30
3M5TL	27
3M5CHA	25
3M3AF	15
3M7BHF	2
7 Mc	
3M4BCE	13,090
3M5AQW	8,476
3M5WI	6,875
3M7BLO	5,330
3M4BTB	2,541
3M3AF	1,775
3M6ID	1,764
3M3BIZ	1,752
3MCXE	1,673
3M5AHL	1,325
14 Mc	
3M6BRU	1,078
3M5BRO	513
3M3BNL	425
3M3AKM	345
3M2CVA	310
3M5CCE	264
3M6AJN	216
3M6PF	150
3M4KL	100
3M7BHF	81
3M3AST	66
3M6VY	42
3M5TL	28
3M5WC	25
3M6JY	21
21 Mc	
3M5AHW	27,468
3M5AQW	16,330
3M5IZ	16,030
3M4BTB	14,165
3M2ALU	8,702
3M3AKM	6,985
3M6ID	6,615
3M6AMR	4,370
3M5WC	4,070
3M3BIZ	3,332
3M3AG	3,024
3M5AHL	2,700
3M3BNL	2,618
3M3AF	2,002
3M5TL	1,392
3M4KL	1,376
3M6AJN	880
3M5BRO	750
3M7AOO	672
3M7BY	290
3M3AXM	288
3M5BFR	180
3M7BHF	170
3M6CED	132

SM2VP	72
SM5CCE	20
SM6PF	2
21 Mc	
SM5CO	8,684
SM7BHF	1,056
SM6VY	592
SM3BNL	288
SM3BIZ	99
SM5TL	28
SM5AFI	24

Switzerland

All Band	
HB9RJ	24,617
HB9NL	12,870
HB9RK	7,526
HB9CI	6,669
HB9KC	4,794
3.5 Mc	
HB9NL	840
HB9RJ	738
HB9KC	204
HB9RK	187
HB9CI	132
7 Mc	
HB9RJ	3,710
HB9KC	1,161
HB9RK	1,026
HB9NL	299
HB9CI	224
14 Mc	
HB9MO	23,472
HB9MU	22,824
HB9RJ	4,316
HB9NL	2,750
HB9CI	2,054
HB9RK	1,278
HB9KC	256
21 Mc	
HB9CV	20,598
HB9NL	160
HB9CI	55

Terr. New Guinea

All Band	
VK9WZ	6,625
7 Mc	
VK9WZ	2,680
14 Mc	
VK9WZ	915

Trieste

All Band	
I1NU	35,409
I1BNU	29,667
I1YCZ	4,356
3.5 Mc	
I1NU	1,320
I1YCZ	35
7 Mc	
I1BNU	5,750
I1NU	3,300
I1YCZ	209
14 Mc	
I1BNU	4,329
I1NU	4,218
I1YCZ	602
21 Mc	
I1BNU	912
I1NU	855
I1YCZ	420

Union So. Africa

All Band	
ZS5U	61,108
ZS6HM	60
7 Mc	
ZS5U	5,709
ZS6HM	2
14 Mc	
ZS5QU	31,010
ZS6AEA	22,491
ZS5U	11,474
ZS4GD	1,160
ZS6HM	16
21 Mc	
ZS5U	4,560
ZS6BJ	306
ZS6YX	260
ZS6HM	4

Uruguay

All Band	
CX6AD	960
CX1OR	150
7 Mc	
CX6AD	24
CX1OR	2
14 Mc	
CX6AD	616
CX1OR	112
21 Mc	
CX2AM	9,889

Venezuela

All Band	
YV5AB	112,222
YV1AD	54,472
YV5DE	52,864
YV5BJ	10,512
3.5 Mc	
YV5DE	1,080
YV1AD	783
7 Mc	
YV5DE	8,303
YV5AB	6,486
YV1AD	5,700
YV5BJ	720
14 Mc	
YV5AB	29,019
YV5AE	15,351
YV5DE	11,067
YV1AD	3,894
YV5BJ	3,596
21 Mc	
YV5AB	5,577
YV1AD	3,455
YV5BJ	204

Virgin Is.

All Band	
KV4AA	113,085
KV4BK	7,420
3.5 Mc	
KV4AA	756
7 Mc	
KV4BK	5,400
KV4AA	3,168
14 Mc	
KV4AA	35,828
KV4BK	96
21 Mc	
KV4AA	3,420

Wales

All Band	
GW3HJR	47,768
1.8 Mc	
GW3HJR	4
3.5 Mc	
GW3HJR	931
7 Mc	
GW3HJR	3,040
14 Mc	
GW3HJR	11,250
GW5FN	9,504
21 Mc	
GW3HJR	504

Yugoslavia

All Band	
YU3BC	105,782
3.5 Mc	
YU3BC	3,570
7 Mc	
YU3BC	9,308
14 Mc	
YU3BC	28,512

Greenland

All Band	
LB8YB	1,820
7 Mc	
LB8YB	6
14 Mc	
LB8YB	1,638

Somaliland

14 Mcs	
VQ6LQ	20,001

Hungary

All Band	
HA5KBA	105,820
7 Mc	
HA5KBA	16,284
14 Mc	
HA5KBA	37,671
21 Mc	
HA5KBA	6

Phone Single Operator

United States

All Band	
W1ATE 5/6 #10 OS	176,881
3.5 Mc	
W1ATE	1,127
7 Mc	
W1ATE	2,673
14 Mc	
W1ATE	63,200
W1HOL	75
21 Mc	
W1ATE	4,640
W1RIL	3,774
28 Mc	
W1ATE	15
All Band	
W2SKE	111,860
W2WZ	55,842
W2VRE	13,920
W2DEM	80
3.5 Mc	
W2WZ	526
W2VRE	130
W2SKE	63
7 Mc	
W2SKE	2,688
W2WZ	374
W2VRE	225
14 Mc	
W2SKE	45,000
W2WZ	29,029
W2GLF	6,864
W2VQM	5,253
W2VRE	2,754
W2QKJ	375
W2DEM	63
21 Mc	
W2SKE	1,531
W2VRE	1,224
W2WZ	286
W2PUN	144
W2DEM	2
28 Mc	
W2SKE	92

All Band	
W3VKD	43,250
W3JTK	12,215
3.5 Mc	
W3JTK	24
W3VKD	21
7 Mc	
W3VKD	1,092
W3JTK	24
14 Mc	
W3LOE	47,838
W3VKD	19,956
W3JTK	7,685
W3OCU	792
21 Mc	
W3JTK	600
W3VKD	493
All Band	
W4OM	36,188
W4HQN	36,153
W4NBV	18,067
W4TWW	5,610
3.5 Mc	
W4HQN	240
7 Mc	
W4HQN	1,204
W4NBV	750
W4OM	165
W4TWW	8
14 Mc	
W4OM	17,856
W4NBV	9,617
W4HQN	9,200
W4CBQ	8,640
W4TWW	3,570
W4SOV	1,425
21 Mc	
W4DOU	2,400
W4OM	1,518
W4YHF	1,092
W4HQN	858
W4TWW	144
W4NBV	50

Phone Single Operator, Cont'd.

28 Mc
W4NQM 576
W4HQN 65
All Band
W5LFG 10,703
W5KC 1,722
7 Mc
W5LFG 660
W5KC 42
14 Mc
W5ALB 4,272
W5SFT 2,070
W5LFG 1,014
W5KC 304
W5YBF 168
21 Mc
W5LFG 2,077
W5QF 1,080
W5CIV 683
W5ZWR 550
W5KC 252
28 Mc
W5ZFS 15
W5KC 2
All Band
W6YY 139,500
W61TA 103,272
W6BJU 17,577
W6BUD 10,880
W6HJK 3,724
W6NJU 1,728
3.5 Mc
W6YY 63
W61TA 48
W6HJK 2
7 Mc
W61TA 2,304
W6YY 2,236
W6BJU 288
W6HJK 70
14 Mc
W6KQY 31,350
W6YY 25,984
W61TA 16,226
W6IEG 11,070
W6GVM 9,480
W6BJU 4,250
W6SWE 3,410
W6BUD 2,133
W6HJK 308
W6NJU 36
21 Mc
K6CZY 15,423
W61TA 12,960
W6YY 10,032
W6BUD 8,299
W6BJU 2,176
W6HJK 1,680
W6NJU 338
W6HJ 320
W6EFR 144
28 Mc
W61TA 2,070
W6YY 1,273
W6NJU 286
W6HJK 2
All Band
W7QDI 2,482
W7VIU 1,430
7 Mc
W7MAH 510
W7JLU 319
W7VIU 85
14 Mc
W7HXG 12,087
W7QDI 352
W7VIU 42
21 Mc
W7AHX 987
W7QDI 490
W7VIU 429
28 Mc
W7QDI 24
All Band
W8JIN 45,640
W8NXF 20,330
W8WZ 15,215
3.5 Mc
W8JIN 90
W8NXF 32
W8WZ 8
7 Mc
W8JIN 1,296
W8NXF 650
W8WZ 380
14 Mc
W8JIN 12,864
W8WZ 8,700
W8NXF 6,400
21 Mc
W8JIN 2,142
W8NXF 768
W8WZ 28
28 Mc
W8JIN 24
All Band
W9NDA 33,744
W9EWC 25,100
3.5 Mc
W9EWC 312
W9NDA 8
7 Mc
W9NDA 1,624
W9EWC 432
14 Mc
W9NDA 18,276
W9EWC 13,464
W9EZD 6,448
W9WKU 2,128
W9UKG 667
W9VOD 345
W9PNE 81
21 Mc
W9ABA 304
W9EWC 6
All Band
WØGEK 2,412
14 Mc
WØNCG 4,263
WØANF 1,026
WØTTW 910
21 Mc
WØGEK 1,431
WØGDE 128
WØTGC 63
28 Mc
WØRVB 255
WØGEK 126

Alaska
All Band
KL7AON 14,536
KL7ZG 4,785
3.5 Mc
KL7AON 4
7 Mc
KL7ZG 102
KL7AON 55
14 Mc
KL7AON 5,481
KL7FAF 5,084
KL7ZG 2,751
KL7AGU 1,640
KL7AWB 1,541
21 Mc
KL7AON 462
KL7ZG 36
28 Mc
KL7AON 4

Algiers
All Band
FA3JY 23,606
FA3OG 12,368
FA3OA 4,002
3.5 Mc
FA3OG 231
7 Mc
FA3OG 84
14 Mc
FA8MB 8,432
FA3OG 3,360
FA3JY 2,775
FA3OA 403
21 Mc
FA3JY 9,044
FA3OA 1,503
FA3OG 792
28 Mc
FA3JY 1,056
FA3OA 8

Angola
All Band
CR6BX 77,958
14 Mc
CR6BX 22,610
CR6CJ 377
21 Mc
CR6BX 2,528
28 Mc
CR6BX 5,226

Argentina
All Band
LU9MA 13,774
14 Mc
LU4DMG 11,200
LU7AAT 7,176
LU9MA 2,380
21 Mc
LU3AX 18,910
LU3EX 7,155
LU9MA 3,800
28 Mc
LU4ARR 3,848
LU9MA 45

Australia
All Band
VK2GW 8,003
VK4HD 1,701
VK5WO 1,372
7 Mc
VK2GW 288
14 Mc
VK5XN 10,918
VK2GW 4,582
VK3ACN 1,950
VK5WO 880
21 Mc
VK4EL 843
VK4HD 630
VK5WO 24
VK2GW 12
28 Mc
VK4HD 252
VK5WO 6

Balearic Is.
14 Mc
EA6AR 1,368

Barbados
All Band
VP6WR 82,026
3.5 Mc
VP6WR 30
7 Mc
VP6WR 176
14 Mc
14 Mc 11,229
21 Mc
VP6WR 18,104
28 Mc
VP6WR 588

Belgium
All Band
ON4SZ 96,917
3.5 Mc
ON4SZ 2,175
7 Mc
ON4SZ 2,160
14 Mc
ON4SZ 9,688
ON4CK 558
ON4LJ 494
21 Mc
ON4SZ 6,020
28 Mc
ON4SZ 1,755

Belg. Congo
14 Mc
OQ5AO 16,701
21 Mc
OQ5RU 38,868

Brazil
All Band
PY2CK 222,326
PY2AHS 127,865
PY4CB 665
7 Mc
PY2CK 247
14 Mc
PY2CK 43,134
PY2AHS 39,312
PY1MK 27,761
PY4CB 480
21 Mc
PY2CK 31,374
PY2AHS 17,355
PY1AZO 391
PY4CB 8
28 Mc
PY2CK 4,590
PY2AHS 1,196
PY4EM 855
PY4CB 81

Br. Honduras
All Band
VP1GG 5
14 Mc
VP1GG 1
21 Mc
VP1GG 1

Canada
All Band
VE2SU 11
7 Mc
VE2SU
14 Mc
VE2SU 10
VE2APC 6
All Band
VE4RO 10
3.5 Mc
VE4RO
7 Mc
VE4RO
14 Mc
VE4RO
21 Mc
VE4RO
14 Mc
VE6RR
All Band
VE7ZM
14 Mc
VE7ZM
21 Mc
VE7ZM
14 Mc
VO6U

Canal Zone
All Band
KZ5KA
14 Mc
KZ5KA
21 Mc
KZ5BR 1
KZ5KA

Canary Is.
All Band
EA8AX 1
7 Mc
EA8AX
14 Mc
EA8AX
21 Mc
EA8AX

Cape Verde Is
14 Mc
CR4AL

Caroline Is.
All Band
KC6AA
14 Mc
KC6AA
21 Mc
KC6AA
28 Mc
KC6AA

Ceylon
All Band
4S7YL
4S7LB
14 Mc
4S7YL 1
4S7GV
4S7LB
21 Mc
4S7YL
4S7LB

Chile
All Band
CE3GG
7 Mc
CE3GG
14 Mc
CE3GG
21 Mc
CE3GG

Colombia
All Band
HK3FV
HK4DF
7 Mc
HK3FV

With the NEW Model HT-30 Transmitter/Exciter

HALLICRAFTERS RAISES THE STANDARDS OF SSB TRANSMISSION

For almost a quarter of a century the constant goal of Hallicrafters engineers has been the improvement of receiving and transmitting equipment standards. This policy of continuous improvement is again reflected in the design and engineering of Hallicrafters amazing new HT-30 Transmitter/Exciter.

Here's a transmitter that's built to give you greater performance . . . greater dependability. And the HT-30 guarantees you greater enjoyment because it incorporates all these wanted features . . .

CHECK THEM AT YOUR JOBBER TODAY!

- BUILT IN V.F.O. READS DIRECTLY IN KILOCYCLES.
- V.F.O. STABILITY IS EQUAL TO MOST CRYSTALS—.009% There are also provisions for 1 crystal for fixed frequency operation.
- SELECTIVE FILTER SYSTEM IS USED FOR RELIABLE SIDEBAND SELECTION. The circuitry employs the proven r.f. selective filter system used by major commercial communications companies. This sytem assures continued suppression of unwanted side band energy and distortion products. Hum, noise and unwanted side band are down 40 db or more, while undesired beat frequency is down at least 60 db. New 60 db range meter for constant monitoring of r.f. output and carrier suppression. Voice control system built in with adjustable delay and anti-trip features.
- SSB, AM, AND CW ARE ALL PROVIDED FOR IN ONE COMPACT UNIT. Front of panel full function control allows selection of AM, CW and upper or lower side band. Only 18″ x 9¾″ x 12″; the unit is powerful—35 watts peak output on SSB.

FRONT PANEL CONTROLS

Band selector 80, 40, 20, 10 meters.
Driver tuning.
Finial tuning.
Speech level.
Carrier injection —0 to 100%.
Meter sensitivity.
Calibration level.
Power off, stand-by, warm-up, transmit.
Operation control. VOX, Calibrate, MOX.
Function selector—AM, CW, upper, lower side band.
Tuning—V.F.O.
10 Meter tuning control.
V.F.O.—Crystal.

hallicrafters
CHICAGO 24, ILLINOIS

AND 15 OTHER FEATURES IN MODEL HT-30 AT ONLY $495.00

Phone Single Operator, Cont'd.

14 Mc
HK3FV 18,150
HK4DF 450
21 Mc
HK3FV 8,250
HK4DF 7,027
28 Mc
HK4DF 240

Costa Rica

All Band
TI2GC 20,116
14 Mc
TI2GC 19,008
21 Mc
TI2GC 2,759
28 Mc
TI2GC 672

Cuba

All Band
CO2BL 109,890
CO8SA 13,370
3.5 Mc
CO2BL 198
7 Mc
CO2BL 3,468
CO8SA 252
14 Mc
CO2BL 33,812
CO8SA 2,441
CO8DL 1,444
21 Mc
CO2BL 3,399
CO8SA 2,610
28 Mc
CO2BL 110

Cyprus

21 Mc
ZC4JA 31,293

Czechoslovakia

All Band
OK1HI 27,027
OK1MB 10,488
3.5 Mc
OK1HI 1,955
OK1MB 160
7 Mc
OK1MB 464
OK1HI 408
14 Mc
OK3IA 7,683
OK1MB 3,492
OK1HI 3,192
21 Mc
OK1HI 1,323
OK1MB 90
28 Mc
OK1HI 4

Denmark

All Band
OZ5KP 37,855
OZ7BG 24,080
OZ7HT 20,736
OZ1PO 6,264
3.5 Mc
OZ7HT 950
OZ5KP 684
OZ7BG 450
OZ1PO 294
OZ7TB 56
7 Mc
OZ7HT 540
OZ7BG 208
OZ5KP 24
14 Mc
OZ5KP 9,537
OZ7BG 8,236
OZ7HT 7,744
OZ7OP 3,008
OZ1PO 1,534
21 Mc
OZ5KP 3,502
OZ7BG 736
OZ1PO 404
28 Mc
OZ5KP 12

Dominican Rep.

All Band
HI6TC 14,726
3.5 Mc
HI6TC 2
7 Mc
HI6TC 325
14 Mc
HI6TC 10,207

Eire

All Band
EI4Q 10,098
14 Mc
EI3S 11,342
EI4Q 4,386
21 Mc
EI4Q 1,173

England

All Band
G3AWZ 117,900
G3HSN 60,952
G3FXB 34,220
G3DOG 2,100
G2AJB 660
G3AWZ 2,520
3.5 Mc
G3HSN 2,436
G3FXB 345
G2AJB 2
7 Mc
G3HSN 608
G3AWZ 600
G3FXB 592
G3DOG 140
14 Mc
G3HSN 18,720
G3FXB 6,936
G3AFM 4,107
G3DPJ 2,150
G3GEN 1,710
G2AJB 576
G3JVJ 528
21 Mc
G3FXB 3,366
G3HSN 1,170
G3DOG 1,150
G3AWZ 1,128
28 Mc
G3AWZ 10

Faeroes Is.

14 Mc
OY2Z 24

Finland

All Band
OH1PN 13,195
OH1NK 3,731
3.5 Mc
OH1PN 160
7 Mc
OH1NK 10
14 Mc
OH1PN 9,163
OH6QI 6,625
OH3RA 5,586
OH2ZE 4,551
OH6PW 2,025
OH1NK 777
21 Mc
OH2SE 816
OH1NK 510
OH3NY 35

France

All Band
F9RM 42,532
F8XP 13,616
F9YZ 12,876
F3NG 3,952
F8PQ 2,135
F9EP 810
F8HC 493
F8LF 442
F8EG 270
3.5 Mc
F9RM 1,452
F3NG 195
F9YZ 3
F8LF 2
7 Mc
F9RM 765
F3NG 168
F9EP 35
F8XP 24
14 Mc
F9RM 6,437
F9YZ 5,175
F7CG 1,575
F3NG 1,269
F8XP 925
F8HC 390
F8PQ 280
F8EY 240
F9EP 132
F8EG 6
21 Mc
F8XP 6,272
F8CW 5,220
F9RM 1,736
F3PW 1,596
F9YZ 1,508
F8PQ 861
F8LF 375
F8EG 234
F9EP 176
F8HC 6
28 Mc
F9RM 247
F8EG 24

Germany

All Band
DL1AU 121,636
DL4UZ 44,933
DL7BA 30,702
DL4ZC 26,117
DL3OC 15,125
DL6VM 12,382
DL4WY 12,283
DL6WD 10,944
DJ1BZ 9,920
DL1YA 8,748
DL9SR 5,774
DL1JY 3,432
DL6DE 2,553
DL7AD 2,345
DJ1MI 1,002
DL4LJ 960
DL1BR 875
DM2ACM 475
3.5 Mc
DL6WD 1,242
DL3OC 1,089
DL4WY 544
DL1AV 525
DL7BA 405
DL4UZ 375
DL9SR 374
DL6VM 220
DL6DE 198
DL1YA 195
DL4LJ 100
DJ2AE 100
DJ1BZ 72
DL1BR 49
DL1JY 15
7 Mc
DL7BA 882
DL1AV 630
DL6DE 578
DL3OC 441
DL6WD 360
DL9SR 120
DL4UZ 81
DJ1MI 40
DL1YA 18
14 Mc
DL4DB 68,289
DL4MW 30,492
14 Mc
DL4BI 28,187
DL4ZC 24,708
DL1AU 19,032
DL4OR 18,000
DL4AK 16,863
DL4UZ 15,556
DJ1BZ 8,056
DL4RI 5,995
DL4CN 4,879
DL4WY 3,400
DL9SR 2,136
DL6WD 1,885
DL1KB 1,840
DL7BA 1,792
DL1JY 1,512
DL3OC 1,435
DL7AD 968
DL1YA 912
DL6VM 651
DL1BR 504
DL4LJ 440
DM2ACM 234
DL6DE 153
DJ1MI 30
21 Mc
DL1AU 22,100
DL1VR 11,271
DL7BA
DL6VM
DL1EI
DL1YA
DL3OC
DL4WY
DJ1MI
DL7AD
DL1JY
DM2ACM
DL6WD
DL4ZC
28 Mc
DL4UZ
DL6VM
DL1YA
DL7BA
DL1AU
DL4WY

Greece

All Band
SVØWK
14 Mc
SVØWK
21 Mc
SVØWK
28 Mc
SVØWK

Guatemala

14 Mc
TG9MB

Hawaii

All Band
KH6MG
KH6PM
3.5 Mc
KH6MG
7 Mc
KH6MG
14 Mc
KH6MG
KH6PM
21 Mc
KH6PM
KH6ER
KH6MG
28 Mc
KH6PM
KH6MG

Hong Kong

14 Mc
VS6AE

India

All Band
VU2JP
14 Mc
VU2RC
VU2JP
21 Mc
VU2JP

Israel

All Band
4X4DK
4X4BO
4X4CX
4X4BL
4X4GB
3.5 Mc
4X4DK
4X4BL
7 Mc
4X4DK
4X4BL
4X4GB
4X4CX
4X4BO
14 Mc
4X4DK
4X4CX
4X4BO
4X4GB
4X4BL
21 Mc
4X4DK
4X4BO
4X4BL
4X4CX
4X4GB
28 Mc
4X4GB
4X4BL
4X4DK
4X4CX

Phone Single Operator, Cont'd.

Italy

All Band
IICQD 87,680
IIAIJ 65,590
IICWX 63,788
IICSP 43,086
IIZZG 41,472
IICCO 30,030
IIAMU 5,000
IIAHW 2,765
3.5 Mc
IICSP 1,220
IIAMU 714
IICWX 700
IICCO 585
IIAIJ 120
IIAHW 6
7 Mc
IICQD 1,088
IICSP 600
IIZTI 540
IICCO 234
IIAIJ 165
IIAHW 132
IIZZG 108
IICWX 60
14 Mc
IIZZG 36,540
IICQD 25,952
IICWX 24,795
IIAIJ 20,735
IIAOY 18,286
IIBJC 14,940
IIEQ 12,803
IITDJ 11,844
IICSP 10,089
IICCO 9,027
IICEI 7,324
IIAHW 527
21 Mc
IIAIJ 6,615
IICHJ 5,208
IICQD 4,920
IICWX 3,520
IICSP 2,160
28 Mc
IICQD 855
IICWX 40

Jamaica

21 Mc
VP5SC 8,862

Japan

All Band
JA1CJ 16,252
JA3AQ 11,623
JA4BB 9,480
KA2AS 9,455
7 Mc
JA1GV 1,249
JA1VP 1,122
JA1CJ 96
JA1EF 75
14 Mc
KA2CR 109,610
JA3BB 13,631
JA3AQ 4,865
JA1AL 4,250
JA4BB 3,124
JA1CJ 2,883
KA2AS 2,460
KA3RR 1,144
21 Mc
JA1CJ 2,675
JA4BB 1,710
JA1CO 1,647
JA3AQ 1,392
KA2AS 990
28 Mc
KA2KC 864
KA2AS 234
JA1CJ 108

Kenya

All Band
VQ4RF 207,998
14 Mc
VQ4RF 49,794
21 Mc
VQ4RF 42,660
28 Mc
VQ4RF 602

Lebanon

All Band
OD5AV 28,428
OD5BA 22,016
14 Mc
OD5AV 4,290
OD5BA 4,147
OD5LJ 3,175
21 Mc
OD5AV 10,152
OD5BA 6,834

Liberia

21 Mc
EL1ZA 450

Lichtenstein

All Band
HB1MX/HE 8,777
3.5 Mc
HB1MX/HE 140
7 Mc
HB1MX/HE 2,736
14 Mc
HB1MX/HE 861

Madagascar

All Band
FB8BC 143
14 Mc
FB8BC 77
21 Mc
FB8BC 8

Mauritius

14 Mc
VQ8AR 704

Mexico

21 Mc
XE1SA 2,937

Morocco Fr.

All Band
CN8MM 276,488
3.5 Mc
CN8MM 1,056
7 Mc
CN8MM 2,775
14 Mc
CN81E 70,299
CN8MM 63,518
CN8EB 32,088
21 Mc
CN8MM 24,024
28 Mc
CN8MM 1,060

Morocco Sp.

All Band
EA9AR 35,939
3.5 Mc
EA9AR 108
14 Mc
EA9AR 11,521
21 Mc
EA9AR 4,824

Netherlands

All Band
PAØULA 20,240
PI1RRS 6,987
PAØTAU 5,264
PAØSNG 4,223
PAØHJK 3,240
PAØUV 1,924
PAØVB 1,215
PAØEEM 806
PAØCN 540
3.5 Mc
PAØULA 1,518
PI1RRS 630
PAØSNG 594
PAØHJK 276
PAØVB 204
PAØEEM 99
PAØPOL 90
PAØTAU 60
PAØUV 18
PAØCN 15
7 Mc
PAØULA 286
PI1RRS 162
PAØUV 48
PAØVB 30
PAØTAU 4
PAØHJK 4
14 Mc
PAØULA 7,392
PAØWIL 2,808
PI1RRS 2,072
PAØTAU 1,624
PAØSNG 1,610
PAØUV 989
PAØCN 360
PAØEEM 285
PAØVB 220
PAØHJK 154
PAØAU 88
PAØZV 42
21 Mc
PAØKX 3,760
PAØHJK 660
PAØTAU 494

Neth. W. Indies

All Band
PJ2AA 19,250
PJ2AI 4,736
14 Mc
PJ2AA 5,852
PJ2AI 1,292
21 Mc
PJ2AA 3,600
PJ2AI 1,080
28 Mc
PJ2AA 2

Nicaragua

All Band
YN4CB 11,096
7 Mc
YN4CB 589
14 Mc
YN4CB 5,198
21 Mc
YN4CB 64

New Caledonia

14 Mc
FK8AL 133

New Zealand

All Band
ZL1BY 60,480
ZL1MQ 26,255
3.5 Mc
ZL1BY 24
ZL1MQ 8
7 Mc
ZL1BY 770
ZL1MQ 304
14 Mc
ZL2GX 37,180
ZL1BY 16,940
ZL1MQ 10,098
21 Mc
ZL1BY 4,940
ZL1MQ 1,105
28 Mc
ZL1BY 42
ZL1MQ 12

No. Ireland

All Band
GI3IVJ 1,332
3.5 Mc
GI3IVJ 3
7 Mc
GI3IVJ 12
14 Mc
GI3IVJ 357
21 Mc
GI3IVJ 121

Norway

All Band
LA7XE 4,905
LA3Y 130
7 Mc
LA7XE 840
14 Mc
LA5YE 19,525
LA7XE 1,675
LA9T 72
LA3Y 56
21 Mc
LA3Y 15

Okinawa

All Band
KR6OH 9,028
14 Mc
KR6OH 1,537
21 Mc
KR6OH 2,322
28 Mc
KR6OH 45

Paraguay

14 Mc
ZP5CF 6,240

Philippine Is.

All Band
DU7SV 10,203
7 Mc
DU7SV 8
14 Mc
DU7SV 2,800
21 Mc
DU7SV 2,025

Portugal

All Band
CT1MB 15,525
7 Mc
CT1MB 15
14 Mc
CT1MB 465
21 Mc
CT1MB 4,872
28 Mc
CT1MB 2,280

Puerto Rico

14 Mc
KP4KD 171

Rhodesia No.

All Band
VQ2GW 13,923
14 Mc
VQ2GW 3,857
21 Mc
VQ2GW 2,992

Rhodesia So.

All Band
ZE4JN 2,070
14 Mc
ZE4JN 187
21 Mc
ZE4JN 323
28 Mc
ZE4JN 6

Roumania

All Band
YO3RF 11,328
YO3GL 10,450
7 Mc
YO3GL 140
YO3RF 108
14 Mc
YO3GL 5,537
YO3RF 792
21 Mc
YO3RF 4,216
YO3GL 126
28 Mc
YO3GL 1

Ruanda-Urundi

All Band
OQØDZ 163,054
7 Mc
OQØDZ 1
14 Mc
OQØDZ 39,574
21 Mc
OQØDZ 19,871
28 Mc
OQØDZ 2,491

Saar

All Band
9S4BS 6,92
3.5 Mc
9S4BS 14
7 Mc
9S4BS 4
14 Mc
9S4BS 3,82

Scotland

All Band
GM2DBX 8,77
3.5 Mc
GM2DBX 16
7 Mc
GM2DBX 13
14 Mc
GM2DZB 31,95
GM2DBX 2,44
21 Mc
GM2DBX 35

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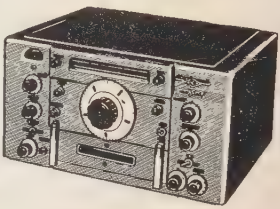
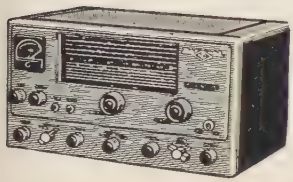
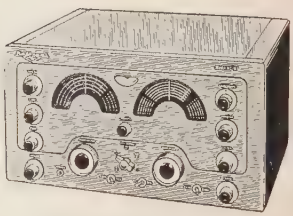
WØGFQ





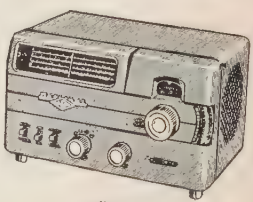
The National HRO-60
Only $30.00 per mo.
Cash price: $533.50

The National NC-125
Only $16.00 per mo.
Cash price: $199.95



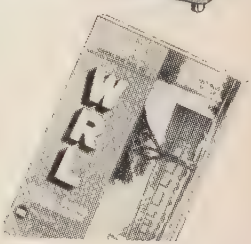
The National NC-183D
Only $22.00 per mo.
Cash price: $399.50

The National NC-88
Only $10.00 per mo.
Cash price: $119.95



The National SW-54
Only $5.00 per mo.
Cash price: $49.95

The National NC-98
Only $13.00 per mo.
Cash Price: $149.95



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for my _____ (Name and Make of Equipment)

on your _____ (New Equipment Desired)

☐ Entire National Line of Receivers ☐ WRL'S New 500A Globe King ☐ Wall-Size Radio Map (25c) ☐ WRL'S New VFO ☐ Latest Recond. Eqpt. List

Name _____

Address _____

City and State _____

Phone Single Operator, Cont'd.

Spain

All Band	
EA7EV	26,412
EA3CY	18,778
EA4EP	12,900
EA7CP	10,788
EA3JE	8,968
EA3IH	3,075
3.5 Mc	
EA4EP	40
7 Mc	
EA9AY	390
EA4EP	64
EA3JE	15
14 Mc	
EA4BF	13,440
EA4CX	12,201
EA3KB	9,558
EA7EV	8,372
EA7CP	4,536
EA3CY	4,343
EA4EP	2,387
EA3IH	1,378
EA3JE	738
21 Mc	
EA3CY	4,736
EA7EV	3,360
EA3JE	1,235
EA7CP	1,128
EA4EP	195
28 Mc	
EA4EP	1,136
EA3JE	645
EA3IH	330
EA7EV	162
EA7CP	2

Sudan

14 Mc	
ST2NW	10,400

Sweden

All Band	
SM3LX	15,209
SM4BTF	9,685
SM3BIZ	8,732
3.5 Mc	
SM7AKO	868
SM4BTF	476
SM3LX	72
SM3BIZ	72
7 Mc	
SM3BIZ	80
SM4BTF	12
14 Mc	
SM3LX	12,602
SM6SA	10,450
SM3BIZ	5,547
SM5BAF	2,842
SM4BTF	2,320
SM3BFR	1,008
SM5WC	840
SM6AJN	840
21 Mc	
SM5CD	5,658
SM4BTF	576

Switzerland

All Band	
HB9RJ	9,805
3.5 Mc	
HB9RJ	1,121
14 Mc	
HB9KU	24,570
HB9RJ	4,284

Trieste

All Band	
I1YAK	65,965
I1BNU	26,885
I1YCZ	18,360
3.5 Mc	
I1YAK	986
I1YCZ	90
7 Mc	
I1BNU	1,155
I1YCZ	375
I1YAK	320
14 Mc	
I1YAK	11,993
I1BNU	6,952
I1YCZ	2,850
21 Mc	
I1YAK	4,428
I1BNU	2,100
I1YCZ	920
28 Mc	
I1YAK	900
I1YCZ	435

Trinidad

14 Mc	
VP4BN	45,676

Union of So. Africa

All Band	
ZS5JY	27,027
ZS5OA	1,395
14 Mc	
ZS5AW	31,345
ZS1BF	4,356
ZS5OA	360
ZS5JY	216
21 Mc	
ZS5JY	23,380
ZS6DW	16,240
ZS5OA	247

Uruguay

All Band	
CX2CN	3,480
14 Mc	
CX2CN	2,332
21 Mc	
CX3BH	1,638
28 Mc	
CX3AA	874
CX2CN	135

Venezuela

All Band	
YV5AB	45,360
YV5DE	17,558
YV5FY	6,477
3.5 Mc	
YV5DE	351
YV5AB	45
7 Mc	
YV5AB	918
YV5DE	800
14 Mc	
YV5AB	8,366
YV5DE	4,902
YV5FY	2,464
YV5AP	616
21 Mc	
YV5AB	5,364
YV5FY	950
YV5DE	192
28 Mc	
YV5AB	120

Virgin Is.

All Band	
KV4BI	4,284
KV4AA	207
3.5 Mc	
KV4BI	9
14 Mc	
KV4BI	918
KV4AA	2
21 Mc	
KV4BI	1,008
KV4AA	154

Wales

14 Mc	
GW3FPH	1,752

CW Multiple Operator

United States

All Band	
W1YMA	12,762
7 Mc	
W1YMA	2,448
14 Mc	
W1YMA	10,314
21 Mc	
W1YEY	12
All Band	
W4KVX	214,200
3.5 Mc	
W4KVX	323
7 Mc	
W4KVX	9,027
14 Mc	
W4KVX	78,922
21 Mc	
W4KVX	2,470
All Band	
W6YMD	193,581
W6AM	191,364
W6EEK	178,770
W6NWL	16,264
3.5 Mc	
W6YMD	2,625
W6AM	1,056
W6EEK	80
7 Mc	
W6EEK	13,728
W6YMD	11,010
W6AM	9,828
K6CYT	1,976
W6NWL	1,200
14 Mc	
W6VDG	43,180
W6AM	39,944
W6EEK	32,604
W6YMD	20,097
W6NWL	1,368
21 Mc	
W6YMD	11,124
W6AM	10,854
W6EEK	8,200
K6AAJ	6,888
W6NWL	3,104
28 Mc	
W6YMD	924
W6EEK	252
W6AM	96
All Band	
W8DUS	49,911
7 Mc	
W8DUS	2,048
14 Mc	
W8DUS	11,077
21 Mc	
W8DUS	5,184
All Band	
W9AVJ	168,163
W91OP	88,320
W9PMZ	2,184
3.5 Mc	
W9AVJ	156
7 Mc	
W9AVJ	8,014
W91OP	5,984
14 Mc	
W9AVJ	30,240
W91OP	25,004
W9RXS	3,160
W9PMZ	2,016
21 Mc	
W9AVJ	12,834
W91OP	3,480
28 Mc	
W9AVJ	143

Argentina

All Band	
LU8ABL	75,552
7 Mc	
LU8ABL	552
14 Mc	
LU8ABL	41,760
21 Mc	
LU8ABL	630

Bulgaria

All Band	
LZ1KAB	94,240
LZ1KDP	61,92
LZ1KPZ	30,62
LZ1KAA	13,77
3.5 Mc	
LZ1KAB	6,04
LZ1KDP	2,61
7 Mc	
LZ1KDP	5,93
LZ1KAA	5,16
LZ1KPZ	3,91
LZ1KAB	3,19
14 Mc	
LZ1KAB	29,48
LZ1KPZ	12,06
LZ1KDP	6,09
LZ1KAA	1,89
21 Mc	
LZ1KDP	2,32

England

All Band	
G2BVN	14,68
3.5 Mc	
G2BVN	37
7 Mc	
G2BVN	79
14 Mc	
G2BOZ	39,42
G2BVN	3,60
21 Mc	
G2BVN	13

Germany

All Band	
DL4KB	51,50
3.5 Mc	
DL4KB	1,03
7 Mc	
DL4KB	1,99
14 Mc	
DL4TA	37,76
DL4KB	7,40
21 Mc	
DL4KB	3,73

Italy

All Band	
I1BDV	136,16
3.5 Mc	
I1BDV	2,8
7 Mc	
I1BDV	8,5
14 Mc	
I1BDV	30,9
21 Mc	
I1BDV	1,4

Sweden

All Band	
SL5BO	22,0
SM5VK	13,1
SM3AU	12,6
3.5 Mc	
SM3AU	7
SL5BO	3
SM5VK	
7 Mc	
SL6CY	3,0
SM5VK	1,2
SL5BO	7
SM3AU	2
14 Mc	
SL5BO	11,0
SM3AU	5,0
SM5VK	1,7
21 Mc	
SM5VK	1,0

Phone Multiple Operator

United States

21 Mc	
W1YEY	300
All Band	
W6AM	98,100
W6NWL	4,000
3.5 Mc	
W6AM	110
7 Mc	
W6AM	3,024
W6NWL	143
14 Mc	
W6WZD	28,300
W6AM	18,585
W6NWL	130
21 Mc	
W6AM	11,8
W6NWL	1,7
All Band	
W8NWO	11,1
W8DUS	7,5
7 Mc	
W8DUS	
W8NWO	
14 Mc	
W8NWO	7,7
W8DUS	3,8
21 Mc	
W8DUS	
W8NWO	

[*Continued on page 113*]

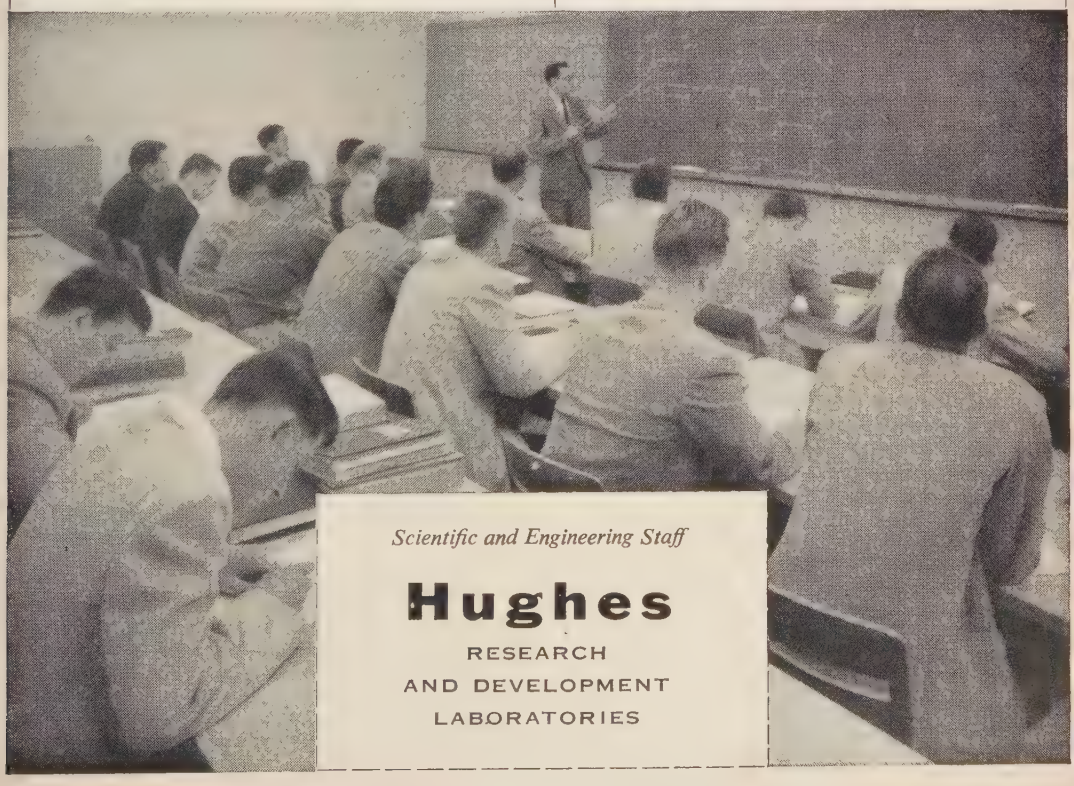
Apply Your Electronics Experience

ENGINEERS AND PHYSICISTS WITH ELECTRONICS TRAINING ARE NEEDED TO CONDUCT CLASSROOM AND LABORATORY PROGRAMS ON ADVANCED SYSTEMS WORK IN THE FIELDS OF RADAR FIRE CONTROL, ELECTRONIC COMPUTERS, GUIDED MISSILES.

The proper functioning of the complex airborne radar and computer equipment produced by Hughes requires well-trained maintenance crews in the field.

At Hughes Research and Development Laboratories in Southern California engineers assigned to this program are members of the Technical Staff. As training engineers they instruct in equipment maintenance and operation for both military personnel and field engineers.

Prior to assignment, engineers participate in a technical training program to become familiar with latest Hughes equipment. After-hours graduate courses under Company sponsorship are available at nearby universities.



Scientific and Engineering Staff

Hughes

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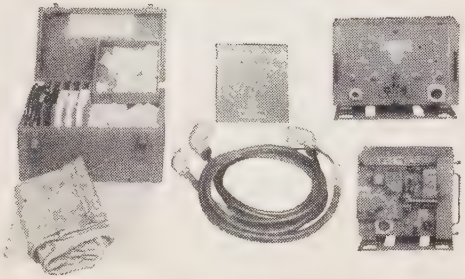
AND DEVELOPMENT
LABORATORIES

Culver City, Los Angeles County, California

ESSE FALL SPECIALS

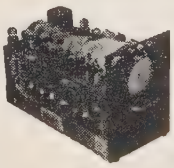
New FACSIMILE SET



Brand New RC-58-B facsimile set complete with BC-908-B amplifier & mounting. BC-918-B Recorder-Scanner with mounting. MC-308-B writing stand, spare parts chest, covers, and cords ready to operate on your 12 V. DC source. Wire or radio may be used as transmitting medium. Messages may be transmitted at the same time as one is being received. Ideal for ham, bank, or business use. Wt. packed 200 lbs. approx.

BRAND NEW orig. package $95.00 ea.

APN-4 RADAR SCOPE



Loran indicator scope. Ideal for conversion to service scope or other uses. Parts alone worth many times price. Contains 27 tubes such as 6SN7GT's, 6H6GT's, 6SL7GT's, 6SJ7GT's, and 6CP1CR, less crystal. In aluminum case approx. 9"x12"x18". Wgt. approx. 15 lbs. packed. Removed from surplus aircraft.

PRICE **$19.75**

DUAL 12 Henry CHOKE

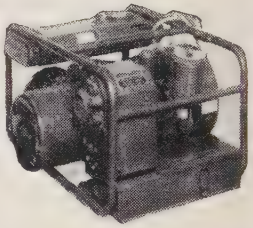
Use as two 12 henry 100 ma. chokes or one 12 henry 200 ma. choke. 150 ohms ea. sec. Size 3 15/16" x 3 9/16" x 7¾" h. Mtg. flanges 3" from top of porcelain insulated connecting posts. Wgt. 15 lbs. Brand new.....ea. **$1.00**

TRIP RELAY

Instantaneous class 9055 Type N. Manufactured by Square D Co. 23-47 amp. range; 600 V. Max. Shipping weight 3½ lbs.

Brand New .....ea. **$1.00**

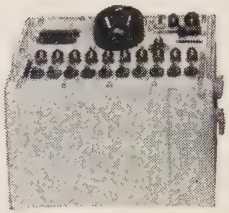
ENGINE GENERATOR PE-162-C



Brand new gasoline powered generator for your emergency, or field transmitters. 550 V. DC Filtered output at 200 Ma. and a 7 volt 3.5 amp DC filament supply. Mfg. by Jacobsen and complete with spare parts and wrenches in original packaging. Unit measures 18½" x 11" x 16". Wgt. 63 lbs.

PRICE ..... ea. **$89.50**

TYPE 1-A NAVY INTERPHONE $42.50



New Navy 1-A surplus interphone master station for up to 10 substations. 115 V. 60 cycle internal transformer type power supply. Consumes 90 watts in talk position, 50 watts in listen position. Has heavy PM moisture proof speaker and microphone unit. Volume is controllable and indicator lights indicate each station. Heavy construction. Size 14" W. x 8⅞" H. x 10" D. Wgt. of unit 50 lbs. Housed in gray enameled metal cabinet.

NEW, Price **$42.50**

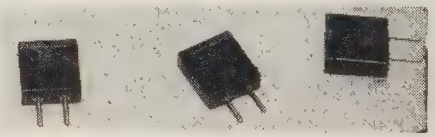
BC-455-B RECEIVER—$4.95

Ideal receiver for mobile or fixed operation. Excellent sensitivity and frequency stability are found in these receivers. New surplus release order—new supply will not last long at this price. Complete with tubes and guaranteed. Less dynamotor. For 6-9.1 mc operation.

Used $4.95

New $6.95

CRYSTALS 50 for $4.95

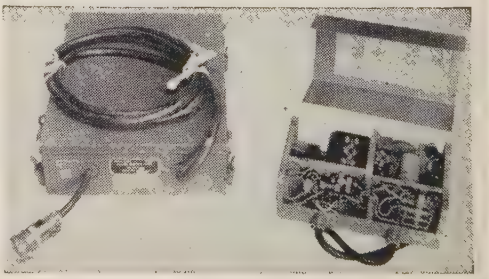


Quartz crystals in various holders. Just like received from Signal Corp Surplus. Not picked over but all chosen at random, from supply of over ½ million. All guaranteed.

50 for $4.95 100 for $7.95

CLOSEOUT! 6 OR 12 VOLT POWER SUPPLY - - -$2.50 ea.

PE-117 vibrator power supply was designed for use on the Army BC-620 Transmitter and receiver a part of the SCR-509 and SCR-510. This will make an ideal supply for your mobile equipment on either the 6 or 12 volt cars. Voltage input changes are accomplished by merely changing links according to diagram in the cover (same vibrator used in either case). Supply is well filtered using choke input and plug-in type capacitors. Additional hash filtering is also incorporated for filaments of receiver. Output voltages are for transmitting 140 V. and 90 volts for receiving. The receiver output voltage is regulated by voltage regulator tube VT184. Maximum current drain is 100 Ma. Entire unit measures 12"x15"x4¾" in metal case or supply only may be removed for use which measures 11"x6"x4½". If you have no immediate use for this unit, it would be a good investment for possible future use. All units used and may be less vibrators and tubes.



LEEDS & NORTHRUP MICROMAX RECORDERS

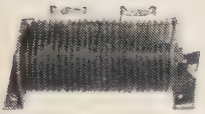
These are the strip type recorders used for controlling and recording a wide variety of processes. Used originally for temp. range of 350-550 degrees C. but may be changed for other applications. Operates on Wheatstone bridge principle using AC galvanometer movement. Original cost was several times our price. These units were removed from demilitarized equipment which in many cases was new; however, all instruments sold as used but guaranteed, or money back if not satisfied.

PRICE—$179.50

SHURE MODEL 812 RECORDING HEAD—$1.00

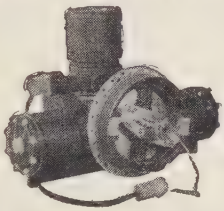
Shure Model 812 wire recording heads containing high quality recording unit with recording, playback, and signal erasure in one small unit. Has standard 4-prong adapter base. A direct replacement for Sears Roebuck Wire Recorder. Original list $15.00. Our Price,
Brand New ..... ea. **$1.00**

RECTIFIER SPECIAL!!



24 V. DC 3 Amp. Selenium rectifiers—$1.50 ea. Just what you have been waiting for—A selenium rectifier to give you the dc source for operation of the many surplus items. Make up your power supply to deliver from 12 to 28 V. DC with these rectifiers and your AC source of from 18 to 36 volts. Parallel several for greater amperage cap. Measures 5¼" L. x 1¾" W. x 1⅞" h.
Brand new ..... ea. **$1.50**

M-1 SERVO UNIT FOR BEAM ROTATION



Unit has self-contained hydraulic pump actuated by 27 V.—11 Amp. 1/5 hp. motor which pumps oil into either side of hydraulic piston giving better than a 100 lb. torque to cable drum. Unit is reversible by actuation of either of two self-contained solenoid hydraulic valves. Connect by cable around antenna beam for any desired rotation speed. Greater adaptability than any other surplus device on the market. Shg. wgt. 37 lbs.
BRAND NEW—Only a few, order early **$4.95**

VARIABLE SPEED MOTOR — $9.50

1/10 H.P., 24 V. DC, 4200 Max. Rpm. Shunt type. Complete with speed control and Jaeger mechanical tachometer of 0-3300 Rpm. Has drive to fit the two 34" tack. shafts included. Wgt. 6 lbs.

Brand New — $9.50

ELECTRIC STOVES — $9.50 ea.

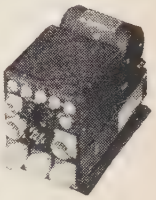
Brand new surplus two-burner stove for use as is or inserting in cabinet top of your cabin or boat. 110 V. operated. Complete with off-low-med.-high Switch for each burner and cord and plug. Top of Black enamel steel 20⅜" L. x 8" W. with 1⅞" deep lip. Bottom enclosure of metal 17⅜" L. x 6" W. x 9½" deep. Features chrome burner rings and clean-out tray. These were made to insert in cabinet and are not to be confused with the cheap hotplate variety of stoves. We use one here for our office kitchen with excellent results.
PRICE, NEW ..... ea. **$9.50**

RELAY

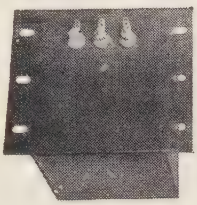
12-18 Volt DC DPST type. Normally open contacts 200 ohm coil.

NEW, price ea. 70¢ 10 for $5.00

RL-9 INTERPHONE AMPLIFIER—$2.95 New



New Navy Surplus Aircraft interphone for use with carbon or magnetic microphone. Uses 12SL7/GT and 12A6 tubes. Complete with 28 V. dynamotor giving 250 V. DC 60 ma. output. Size 8¼" x 1¾" x 6½" overall. Wgt. 7½ lbs. BRAND NEW. ea. **$2.95**

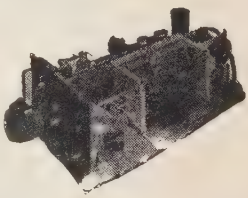


TRANSTAT AUTOFORMER

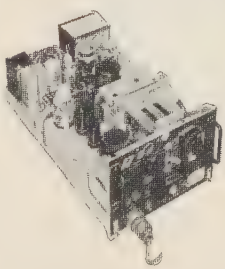
Output 423 V. @ 8 amp. with 117 v. 60 cycle input. Size 6½" x 5¼" x 5" h. Wgt. 15 lbs. Government cost $28.00. Our Price, New **$1.95**

T-39/APQ-9 RADAR XMTR

Described in Feb. '50 "CQ" for conversion for the 420-450 Mc. amateur band and citizens band. Also contains many parts for the UHF experimenter such as 2—8012 tubes, fan and motor, switches, pots, gears, counter, etc. Equipment removed from aircraft. Our Close Out, quantity limited. **$4.95** ea.



Shipping wt. 43 lbs.

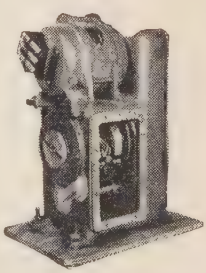


T-26/APT-2 $9.75

Contains 2—5R4GY; 1—2X2; 1—807; 1—931A photo multiplier; 1—6AG7; 2—6AC7; and 2—368AS Western Elect. tubes. VHF osc. circuit, motor, etc. Built-in 115 V. single phase 400 cycle power supply. All tubes included. Size 21" L. x 10½" W. x 7¾" H. in metal case. Wgt. approx. 45 lbs.
USED BUT GOOD

$9.75

TORQUE AMPLIFIER, NEW, $9.75 ea.

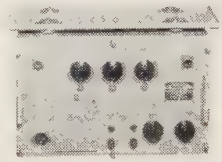


Ideal unit for your application for power steering, antenna rotation, or power control of any rotating device. Small amount of power applied to input shaft is reproduced in any direction with greatly multiplied torque on the output shaft. Speed varies directly in any direction according to input. 110 V. AC 1/40 hp motor supplies added torque thru gear & mechanical hookup. Motor requires capacitor of 85-120 mfd. for single phase starting. Mallory cap. selector listed in this ad ideally suited. These were used on gun control device by the Gvnmt. and cost hundreds of dollars to mfg. Get one or more now for future applications as these surely won't last long and will be hard to locate later. Unit fully enclosed in aluminum case size overall 12" h x 5⅜" w x 7½" d. Wgt. 23 lbs. Packed approx. 30 lbs. Brand new, original pack ..... ea. **$9.75**

EF-8 GAS ENGINE DRIVEN GENERATOR

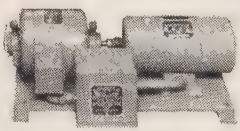
Small ½ hp. Lauson gasoline engine driven generator for your mobile and field day use. Supplies both 12.6 V. DC 2 A. filament current and 500 V. 85 milliampere DC plate current. Engine is completely shielded and filtered for minimum noise elimination. Unit comes complete with spare parts, 50 ft. cord, gasoline and oil cans, set of tools, carrying case, and instruction book. Size 21⅝" long x 16-1/16" h x 10⅜" wide. Wgt. packed, including accessories, 130 lbs. Wgt. unpacked 64 lbs.
Brand new Navy surplus ..... **$42.50 ea.**

OAV-1 TEST SIGNAL GENERATOR—$19.50



This signal generator was used to provide a test signal of constant frequency for operation and alignment of IF amplifier stages in the CG-46ACQ type receivers. The generator covers the range between 150-250 megacycles. Amplitude modulated square wave output is obtained at frequencies of .1, 1, 10, and 100 Kc. depending on the position of the Freq. mod. Pulse switch. A 15 Mc. signal is also provided by a second osc. stage. Power is supplied by internal 115 V., 60 cycle AC supply connected to source by cord provided. Wgt. of unit 62 lbs.
BRAND NEW with instruction book. Price **$19.50 ea.**

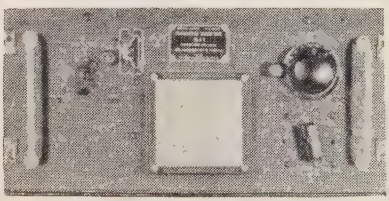
TYPE CAEN-21887 MOTOR GENERATOR SET



115 V. 60 cycle 3400 RPM GE enclosed motor of ¼ Hp. drives a DC generator with outputs of 400 V. 155 Ma.; 400 V. 20 Ma. and 15 V @ 3.5 amps. Makes an ideal power supply for surplus transmitters supplying both HV and filament. Unit weighs 82 lbs. and measures 22½" L. x 8" H. x 10" D. overall.
BRAND NEW—Motor & Gen..... **$29.50**

TU-7, TU-26, and TU-10-B Tuning Units

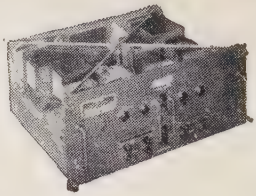
$1.95 ea.



Used in the BC-375 transmitter, but the most favorable and acceptable piece of surplus gear for obtaining good cheap useable parts. The TU-10-B contains three double spaced transmitting type variable condensers of 16, 27 and 7 plate varieties, 3 mica transmitting type micas, 2 isolantite shaft couplings, antenna coupling switch, two precision vernier dials, chokes, inductances and other useful parts. Better order plenty before supply is exhausted again. TU-7, and TU-26 also in stock, same price. Ship wt. 13 lbs., size 7⅝" x 16½" x 7½".

Used—$1.95 ea. **New—$2.50 ea.**

RA-105 POWER SUPPLY



Here is a 115 V. 60 cycle Power Supply ready to use with outputs ranging from 110 V. to 2400 V. Or a bargain just for parts alone. Here is what you get:

1—Power Transformer, 355-0-355 and 490 V. @ 325 Ma.

1—Power Transformer, 2400 V. @ 40 Ma.

1 -Fil Trans. SI-6.4 V @ 12A; S2-6.4 V at 10.6A. S3-5 V. at 3A; S4-5 V. at 3A; S5-5 V. at 3A; S6-2.5 V. @ 1.75 A.
1—Fil Trans 6.3 V. at 10 A.; 2.5 V. at 5A; 2.5 V. at 5 A.
1—Dual Choke 12 Hnry. at 100 Ma.; 1—Choke 59 Hnry. at 100 Ma.; 1—H & K Circuit Breaker, 10 A. 117.5 V.; 1—H&K Circuit Breaker Time Delay Magnetic; 1—Interlock Switch; 1—7 Mfd. 800 vdc Oil Cond.; 3—7 Mfd. 600 vdc Oil Cond.; 2—4 Mfd. 600 vdc Oil Cond.; 1—2 Mfd. 1000 vdc Oil Cond.; 1—2 Mfd. 400 vdc Oil Cond.; 1—2 Mfd. 5000 vdc Oil Cond.; 1—1 Mfd. 400 vdc Oil Cond.
Also miscl. resistors, pilot lights, controls, etc. All the above, brand new, for **$14.95**

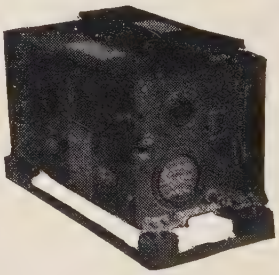
Size 23¾"x20"x10", Wgt. 120 lbs.
Kit of tubes including 3—5U5G's; 3—2x2/879's; and 1—6X5 ..... **Additional $4.00**

RADIO RANGE FILTER—FL-5-C

Similar to the FL-8 filter much desired for ham use. Uses external range-voice switch allowing remote mounting. Size 3-11/16" x 4" x 2-15/16". Ship wgt. 3 lbs.

BRAND NEW **$1.75**

BC-AS-230 TRANSMITTER—$3.95



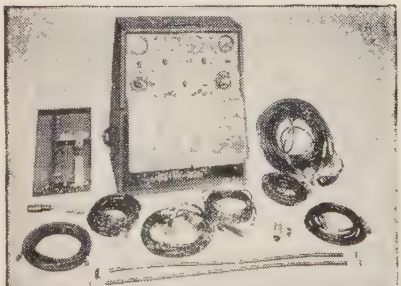
Brand new transmitters made to operate on 12 V. dc. Ideal for mobile use in new cars with 12 V. system. Contains four tubes with power output of approx. 25 watts. 0-1.5 amp. RF ammeter alone worth the price. Freq. range 195-13,975 kc. with full set of plug-in coils (one only picked at random packed with transmitter & included) Wt. approx. 13 lbs. Shock mt. included.

BRAND NEW Price

$3.95

BRAND NEW 12 V. DYNAMOTORS

DM-40 Input: 12-14 V. 3.4 A. Output: 172 V. -138 MA. Here is an ideal dynamotor to adapt to mobile uses on the new 12 V. cars. Don't pass up this buy even if your intended uses are not immediate. Size 6¾" L x 3½" dia. 4" lead with 6 pin Jones plug. Shipping weight 7½ lbs.
New Price.....ea. **$2.75**



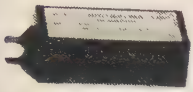
TEST SET EE-1A—Brand New—$29.50

Originally used to test turbo superchargers but may be cannabalized for parts such as combination AC & DC volt-ohm meter, variable speed drive as described on this page, manifold pressure gauge, .10-75 inches of mercury, amp. test gauge, adjustable pressure chamber, Fluorescent lights, aluminum case which folds together in center forming portable case size 2' H x 22" W x 12" D. with handles. (Makes ideal amplifier console). Olive drab crackle finish. Tool kit is also included containing slip joint pliers, screwdriver, torque wrench, tube puller, socket wrench set extension, & socket, spare fuses & bulbs, rt. angle drive, other accessories include 2—34" tack shafts, 15'⅛" hose with fittings, coil hi voltage cable/probe and clip. 75' 4 cond. #12 & 14 cable, miscl. other cables and plugs. Entire unit brand new sealed in evacuated metal can shipped in wood box. Wgt. 270 lbs. PRICE **$29.50 ea.**

MINIATURE STORAGE BATTERIES

For pocket radio & Radio Controlled Models.

BB-51, 6 V. MINIATURE



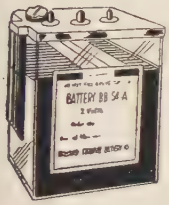
Consisting of 3 lead acid cells delivery 6 V. for 2.75 hrs. thru a 300 ohm resistance. Pin type terminals. Size overall 4-3/16" x 1¼" x 15/16". Wgt. approx 5 ozs. New, dry-charged .....ea. **$1.75**

BB-52, 36 V. MINIATURE

Consisting of 18 lead acid cells delivering 36 Volts for 3 hrs. thru a 1200 ohm resistance. Pin type terminals. Size overall 4⅛" x 1-7/16" x 15/16". Wgt. approx. 5 ozs. New, dry-charged .....ea. **1.95**

COMPLETE PACK BB-208

Includes three of the BB-52 and one of the BB-51 storage batteries above, all packed in vacuum sealed can. Price, new, dry-charged **$6.00**



BB-54-A
2V. 34 AH

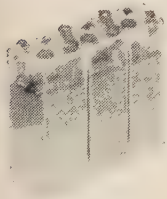
Plastic case size 4" x 3" x 5⅜" h. Dry charged, fill as above. Wt. 3½ lbs. Price .....ea. **$1.95**

BATTERIES

3-TA5-9B—Manufactured by Exide Battery Co. for aircraft. Size 5" x 5" x 9" overall. Shipping weight 15 lbs. New dry charged. Fill with 1.265 sp.g. sulphuric acid. Price .....ea. **$5.75**

DELCO MODEL 6TN23 12 V. 70 AH

Brand new dry charged 12 V. 70 AH storage battery in hard rubber case size 10½" x 10" x 9" h. Ideal for boat use or auto. Keep one around the shop for your experimenting or service work. Wt. 72 lbs. **Price $12.50 ea.**



NEW STORAGE BATTERIES
ER-25-6, 6V. 25 AH

Plastic case size 7½" x 2-9|16" x 6⅜" h. dry charged, fill as above. New price Wt. 7¼ lbs. dry. **$3.95**

ER-40-4, 4 Volt, 40 AH

Plastic case size 6½"x5¾"x4⅜" h. dry chg. fill as above. Wt. 10 lbs. dry. Price.....ea. **$4.95**

R-1/ARR-1 RECEIVER — $2.95

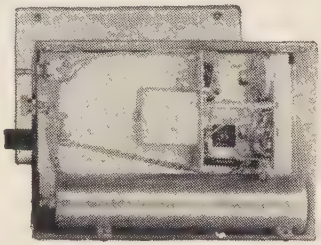
Described in "Ralio TV News" Jan. 1949 for use as 220 Mc. converter. Essentially a two stage RF acorn tube superhet converter as it now stands. Small enough for mobile only 3½" W x 3"H x 10" D. Rugged Aluminum construction. Uses four 954 acorn tubes included. Filaments now operate on 12 or 24 volts by merely throwing switch in unit or very easily modified for 6 V. operation. Dial is calibrated in range of 234-258 Mc. Operation can be changed for use from 50 to possibly 300 Mc. Also, the ARR-1 could be used for a preselector. Wgt. of unit 4 lbs. Cover not shown but included. Complete with conversion as written in above mag. Brand new demilitarized units.

Price, Brand New—$2.95

ARR-1 Antennas for above receiver and frequencies—NEW **$1.25 ea.**

Co-axial antenna relay for use with above or other transmitter-receiver combinations—NEW **$1.25 ea.**

ARR-1 TEST OSCILLATOR

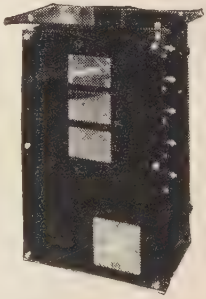


$4.95

Good used

Operates in range of 234-258 mc. using goldplated cavity. Adapt this unit for a transmitter for companion to receiver listed this page. Circuit uses two type 955 acorn type tubes included. For battery operation using two 45 V. B and one 6 V. A batteries (not incl.) Housed in alum. cabinet size 6¾" x 7" x 9¾". Wt. 5½ lbs. Circuit diagram pasted to back of cabinet.

BATTERY CHARGER (ED33511)



Mfgd. by Ward-Leonard Electric Co. Type 16888.19. 115 V. DC. Charging rates 14 Amps. max. Complete with cord, kit of spare parts. Brand new, perfect condition. Overseas packed. For 6 to 15 2-Volt cells. Acquisition cost to Government $300 each. Size approx. 12" wide x 20" high x 10" deep. Wgt. of unit 45 lbs. BRAND NEW—Price

$12.50 ea.

Battery charger (ED33510), similar to above except Charging rates 30 Amps. max. Size approx. 20" wide x 20" high x 10" deep. Wgt. of unit 65 lbs. BRAND NEW—Price

$14.95 ea.

Mallory 1.4 V. Mercury cells 25¢ ea., box of 4

Unaffected by extreme temperatures, humidity or shelf life. Long life cells measuring 1-3/16" dia. by ⅝" h. New, box of 4 ..... **$1.00**

REMIT SHIPPING CHARGE AND INSTRUCTIONS WITH ALL ORDERS, OTHERWISE ORDER WILL BE SHIPPED EXPRESS COLLECT. ALL ITEMS GUARANTEED TO YOUR SATISFACTION OR MONEY REFUNDED IF RETURNED PREPAID WITHIN 10 DAYS OF RECEIPT. MINIMUM ORDER $5.00.

ESSE RADIO CO.

40 WEST SOUTH STREET
INDIANAPOLIS 25, IND.

. . . de W2NSD

[*Continued from page 12*]

it in on a card or letter: Do you know any ham families? Families where there are three or more licensed? Who are they and what are their calls? What well known people have ham tickets and what are their calls? Do any of our recognized writers have tickets? Has anyone managed to build a ham rig into a modern home and keep it unobtrusive? If so, how about some pictures? If you have any unusual anecdotes relating to ham radio they certainly would help too.

New Products

Pursuant to the previous remarks on commercial equipment you will notice that we have some sort of article on a commercial product almost every month. We all recognize that if a certain piece of ham equipment is a real dog, *CQ* cannot come right out and say such a thing. The simplest answer to this is the one I have accepted and that is to steer clear of such items and make sure that we put out dope on the better equipment. In every case we try our best to have the equipment tested by our staff and the article written by the tester for in this way we feel sure that the report is accurate. You can read for yourself very easily in the article just how much the tester really liked the equipment. The first article of this nature appeared a few months ago on th *Heathkit DX-100* transmitter. In some cases w will not be able to follow this policy due t unusual circumstances. For instance in th issue there is an article on the new *Nationa NC-300* receiver written by the designer of th receiver. We were anxious to get you a repo on this receiver as soon as possible because c the news value that it holds, and we felt tha little would be gained by waiting for a unit t be made available to us for test. *National* tel us that it may be a considerable time before receiver would be available for such a test b cause their entire first year's production is a ready sold out and they just don't have ar receivers left.

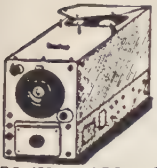
K2ORS

The editorial by Jean Shepherd, K2OR flipped a lot of people last month and I'll t to get more such items from him. He is no at work on an article or two for us which shou be wonderful. One, a how-to-do-it article c QSO's, is destined to be hung on the walls most shacks. Jean is on the Mutual Netwo daily from 12:10 to 12:30 and Saturday afte noons from 4:00 to 5:00 as well as on WO in New York at other times. I listen to hi at every opportunity and think he is excelle

[*Continued on page 108*]

SAVE!...BARGAINS GALORE!...SAVE!

COMMAND — TRANSMITTERS — RECEIVERS



FAMOUS "Q" 5'rs
190-550 KC W/TUBES

XLNT COND. **$9.95**

BC-455 or ARC 5 Recvr. 6-9 MC—with tubes for 40 Meters. Brand New $5.95
Excellent 4.95
Used. As is less tubes 1.95
BC-454 or ARC5 Receiver 3-6MC—with tubes for 75 & 80 Meters. Brand New $7.95
Excellent 4.95
Used. As is less tubes 2.95
R-25 ARC5 Marine Band Receiver 1.5 to 3 MC. Brand New with tubes 28 V Dny $8.95
14 V Dynamotor above receiver—used XLNT ..... Used 2.95
New $3.95
T-19 ARC5—3 to 4 MC XMTR. Excellent 6.95
T-19 and/or 696 XMTR 3-4 MC. As is 5.95
BC457 XMTR 4-5.3 MC. Exlt. Like new 5.95
BC457 XMTR 4-5.3 MC with tubes 4.95
As is less tubes 2.95
BC457 New. Original Carton 5.95
BC458 or ARC5. 5.3 MC. New with tubes, used for sideband. ECO 5.95
BC458 or ARC5, Used. As is less tubes 2.95
BC459 XMTR. 7-9. IMC. New in original cartons 7.95
T-22 ARC5. New, 7-9 MC XMTR, Original Cartons. Value $100.00 ..... 5.95
T-22 ARC5 XMTR 7-9 MC as is, less tubes 3.95
T-18/ARC5, 2.1-3 MC XMTR, Marine, 80 or 160 XMTR and Civil Defense. New, Orig. carton 4.95
BC-456 Modulator. Xlnt with tubes 3.95
BC-456 Modulator. New with tubes 4.95
MD 7 Modulator. Push-Pull 1625 (12V-807) will modulate 100 W of carrier. Xlnt cond., with tubes. Complete with dynamotor 5.95
M-7 Modulator—Same as above—New 9.95
ARC5-R28—2 meter receiver. VHF 2 meter superhet, complete with tubes 9.95
ARC5-T23—2 meter Xmtr, Xlnt with tubes. Companion to R28—2 meter Recvr, complete with tubes—2-832 in final range 100-156MC. 4 channels are provided using 4 separate coils 9.95
BC-450 3 Receiver Control Box. Xlnt 1.49
BC-451 Transmitter Control Box. Xlnt 1.49
3 Receiver Rack. Xlnt 1.49
2 Transmitter Rack. Xlnt 1.49
Fil. XFMR for above equip. 110 Pri., sec. 2½ V CT @ 1 Amp. New 2.49

Meters—Weston • Sangamo

All New. All D.C. 2" Square.

0-2 Ma
0-5 Ma
0-15 Ma
0-50 Ma
0-100 Ma
0-200 Ma
0-300 Ma
0-500 Ma

$3.29 each
or
3 for $9.00

DC VOLT METERS—2" SQ.

0-20 V. DC	$3.29 each
0-40 V. DC	or
0-300 V. DC	3 for $9.00

BC-375 Mod. XFMR. Matches pair of 6146's, 815, 807, 1625. New $2.95

OIL CONDENSERS

2 MFD—5000VDC GE, New $5.95
3 MFD—Sprague, 4000 V. New 5.95
2 MFD—GE, 4000 V. New 3.95
2 MFD—Aerovox, 2500 V. New 2.49
10 MFD—Fast, 600 V. New 1.49
2 MFD—Aerovox or Solar, 600 V. New 3 for .59
4 MFD—GE, 600 V. DC, New ..... .97

ARR-2 RECEIVER
234-258 MC. TUNABLE

11 Tube Superhet. Easily converts to 2 meters.
Like New $4.95
Xlnt $3.95

PLATE TRANSFORMER

American Trans. Co. Input: 115 V. A.C. 60 Cycle. Sec. 2240 V.A.C. CT @ 500 Ma. **$14.95**
BRAND NEW Shipping Wt. 55 lbs. .....

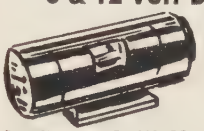
AMATRAN-VARIAC
100 AMP
ONLY
$59.50 NEW

110 VAC-60 Cy. Input. Output 0 to 110 VAC max. load 100 Amp.

110 V. POWER SUPPLY ARC 5 OR 274N COMMAND RECEIVERS

Just plug it into the rear of your 274-N RECEIVER . . . any model. Complete kit and black metal case, with ALL parts and diagrams. Simple, easy to build in a jiffy. Delivers 24 volts plus B voltage. No wiring changes. Designed especially for the 274-N receiver. ..... **Only** $8.95
Assem. $12.95

6 & 12 Volt Dynamotor Specials



PE-101C DYNAMOTOR

This is the Dynamotor the hams have been talking about! Easily adapted to supply on 12 V. input **500 V. DC. @ 200 Ma.** and also 235 V. DC. @ 125 Ma. Brand New $6.95
Eicor Dynamotor—11.6 V. DC. input. Output 425 V. DC. @ 375 Ma. Brand New $10.95
Wincharger Dynamotor—12 V. input. output 440 V. DC @ 220 Ma. Brand New $7.95
BD-77 Dynamotor—12 V. input. Output 1000 V. DC @ 350 Ma. Brand New $18.95
BD-69 Dynamotor—Made by Eicor—14 V. input @ 2.8 A. Output 220 V. DC @ 80 Ma. Brand New $3.95
PE-73 Dynamotor— 24 V. input. Output 1000 V. DC. @ 350 Ma. Brand New $8.95
Used $6.95
DM-35 Dynamomotor—12 V input-output 625 V @ 225 MA. New $15.95
Used ..... $ 9.95

GP-7 TRANSMITTER

100-watt master oscillator type. Used on any frequency from 350 to 9050 KC by using the proper plug-in tuning. Type 803 PA and built-in 400 cycle power supply using pair of 1616 rectifiers. Three 2-inch panel meters: 0-300 MA DC, 0-9 RF Amps. 0-15 AC Volts. A gold mine of excellent usable components for building, serving any high wattage rig. Complete with one tuning unit and tubes. **$9.95**
Excellent condition .....
XLNT Cond. without Tubes $6.95

MARINE-AMATEUR ARB-RECEIVER

105 9050 KC. Four Bands, Calibrated Dial, LF-Ship-BC—80 & 40 Meter—Complete with Tubes and Dynamotor. For 24 Volt operation; easily converted to 110 V—12 or 6 Volt. Size 8¼"x 7¼" x 15¼". Like New. With schematic. **$18.95**
Weight 30 lbs. .....

BC-375 100 Watt TRANSMITTER—Voice CW—Freq. 200-500 KC., 1500-12500 KC. by use of plug in Tuning Units. Uses 1/10y & 4/VT-4C Tubes. Size: 23" L x 21" H. x 8" W. Complete with Tubes, less Tuning Units—Price ..... Exlt. $15.95
Cash & Carry ..... $ 9.95

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	New
TU-7 4500-6200 kc	$2.29
TU-8 6200-7700 kc	2.29
TU-9 7700-10000 kc	2.29
TU-10 10000-125 kc	2.29
TU-26 20-500 kc	2.29

ANTENNA MATCHER

VARIABLE inductance Tuner with Calibrated Veneer Lock Dial, 100 Watt Cap. (shown upper right of BC-375 picture above). Size 7½" x 3½". Rotary Ind. ..... USED: $6.95

Broadcast Band and Aero MN-26C Installation

A 12 tube remote control manual direction finder desirable for commercial type navigation on boats and planes. Has frequency range of 150 kc to 1500 kc in 3 bands. This frequency covers the beacon and standard broadcast bands. Operates on 28 V. DC input. Complete installation consists of:
MN-26C Receiver. Brand New $9.95
MN-20E Rotable Loop ..... New 4.95
MN-52 Azimuth Control Box ..... New 2.95
Wobulator—Build your own Sweep Generator—With Schematic $1.95
(See Dec 1954 Radio & TV News, Pg. 131

All prices subject to change without notice
Cash with order. Include 4% Sales Tax with California orders—All orders F.O.B. Los Angeles.

SAM'S SURPLUS, 1306 BOND ST., LOS ANGELES 15, CAL.

. . . de W2NSD [*from page 106*]

As a matter of fact that is how come I got in touch with him about writing the editorial. Since then we have become friends and I am attempting (not too successfully) to teach him to water-ski (I've got a little Chris-Craft and go out water-skiing with Jim Morrissett (K2OLK) at every opportunity. We take along anyone we can rope into the trip and put them on the skis as soon as possible).

Positive Thinking

It is strange that so many people have read the Dale Carnegie book, "How To Make Friends and Influence People," and yet completely ignore his irrefutable facts. "The Power of Positive Thinking" by Norman Vincent Peale is another book that cannot easily be argued with, and yet, how many of the people who read this book practice what it preaches? You can apply this thought to the amateur bands. One of the things that has acted strongly to slow down ham radio is the negative attitude so prevalent on some of our bands. An amateur who goes on the air day after day, month after month, calling "CQ, no lids" is ill. We have no regulations to stop this, and we don't want any. When an amateur goes so far beyond the common bounds of courtesy he should be told off immediately by everyone who hears him. Putting up with such things hurts everyone. Suppose that an FCC Commissioner happened to be tuned in and heard such a disgra on our bands? Those who tune the low end 75 have heard that and worse.

When you hear things going wrong make effort to straighten them out. At least Don't move up the band and talk about awful thing you just heard going on—wh it's wrong, fix it. Tell the guy what you f is right, don't cuss him out for doing wro

Factions (also known as Sects and Cult

It is very easy to divide up into factions a talk only with people who agree with you, in this way you lose in the long run. Only union is there strength. Radio clubs have c lapsed more from such problems than fr any other difficulty. A good example of this the TT gang which grew very slowly unti national group was formed. Activity sprung then at an amazing rate. Soon they divided i two groups, then into four . . . all pretty mu at odds with the others. The spread of slowed down to a crawl under this formida burden. Now, with the establishment of RTTY Column in *CQ* as a communicat medium for all of the groups under the vig ously non-partisan direction of Byron Kre man, W2JTP, I believe that this exciting meth of amateur communication will grow mu faster and achieve the popularity that it serves as a rapid, reliable and not-expens

[*Continued on page 110*]

SINGLE SIDEBAND TECHNIQUES

by Jack N. Brown, W3SHY

This is the latest addition to the "CQ Technical Series." Over 2000 Hams took advantage of our pre-publication offer and are now probably sitting back enjoying Jack's breezy style of telling the full story of SSB. This book is a continuation of Jack's series "Getting Started on Single Sideband." In this book he goes on to describe two different SSB transmitters and several items of useful test equipment, and throws in a good background on how to kep your SSB signal clean. This is the only book of its kind on the market. Some may try last-minute imitations, but they'll never equal it.

112 pages $1.50

Radio Amateurs'

MOBILE HANDBOOK

by William I. Orr, W6SAI

A man of many facets is our man Bill Orr. in his MOBILE HANDBOOK, Bill has put together a book that will guide you to further enjoyment of mobile operation. It is thoroughly up-to-date and replete with 170 schematics, drawings or tables, 74 photographs and 157 subheadings to cover the entire field of mobile installation, operation and maintenance. A valuable book for the old-timer as well as the newcomer.

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CQ, THE RADIO AMATEURS' JOURNAL

by well-known Hams and authors from around the world

New format, new cover, new material, better articles are the by-words at the CQ Editorial offices. Reacting to the hundreds of letters received during the past summer on "what I want in CQ," the editors put their heads together and came up with this NEW looking CQ. Regardless of what month you chose out of the next 12 or 24, CQ will contain first-rate material from the best authors in the Ham game. Your subscription is a guarantee (a money saving one at that) you will be among the first to see these features.

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CQ Magazine

67 West 44th Street, New York 36, N.Y. CQ-10

I enclose $ _____ for which please send me:

_____ copies of your "Mobile Handbook" at $2.00/copy.
_____ copies of your "SSB Techniques" at $1.50/copy.
All New York City purchasers please add 3% sales tax to above items.

_____ year subscription to CQ, The Radio Amateurs' Journal at $3.00 for one year, $5.00 for 2 years, $7.00 for 3 years.

The subscription rates apply to U.S., U.S. Possessions, APO and FPO only. Elsewhere add $1.00 per year per subscription for Postage.

My correct address is:

_____ _____
(name) (call)

_____
(street or avenue)

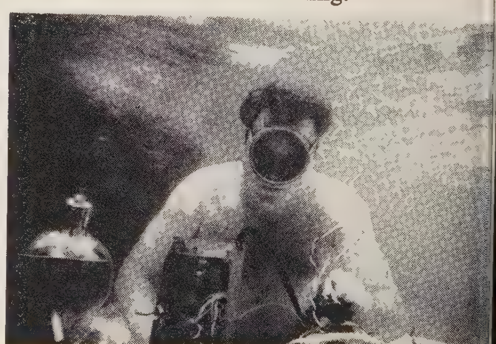
_____
(city) (zone) (state)

. . . **de W2NSD** [*from page 108*]

branch of our hobby. Almost every subdivisi of ham radio has or has had such a problem.

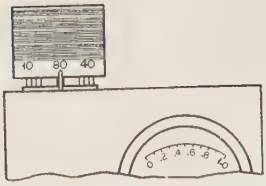
Say, have you read the RTTY Column y Frankly I am exceedingly pleased with t job Byron is doing. Let me warn you thoug *Beware!* . . ratioteletype is one of the m contagious strains of the virus ham radio. F about the cost of a regular typewriter you c buy a teletype machine and build a TT co verter, all that you need in addition to yo regular transmitter and receiver. Then you n only have an electric typewriter but you are the air with *RTTY!*

A real cool setup, man. This might be co sidered to be the end of the line for those th want to operate a water cooled rig. The rig w set up in the clear waters of Bermuda VP9BN and the underwater photography w done by Park Brecht who runs an outfit cal Undersea Sports. Park takes people for und water tours, using underwater breathing paratus, and is well known and liked Bermuda. The crystal clear waters of Bermu make for wonderful swimming.

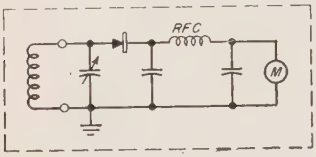


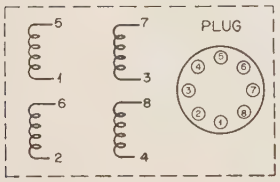
W2NSD takes a turn at the key of the wa cooled kilowatt, but is forced to give up af a few minutes due to his not being able to member what was received and having no b point pen to write the copy down. Note t underwater QSO's tend to be considera shorter than regular ones as some people h a tendency to run out of breath under wat though they seem inexhaustible out.

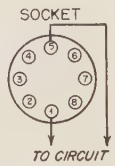
[*Continued on page 112*]



On his wavemeter, W1YHU uses a single coil form made from an old octal tube base. The key is filed or broken off to permit plugging the form into the socket four different ways. A pointer by the socket indicates the band in use.







. . . de W2NSD

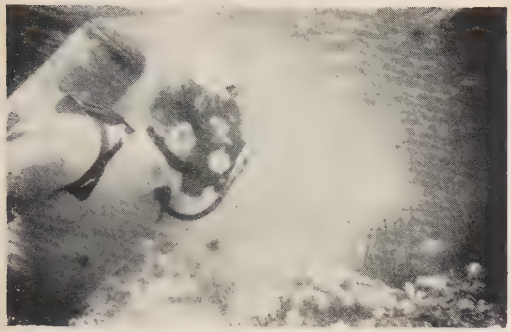
[*from page 110*]

W1PST works a rare one while his br KN2OQK keeps the log. Both were spend their honeymoon together on Bermuda. Unc water operation has one other side benefit . . . it cuts down on the side talk, allowing to put your full attention to the QSO. Note t the final tube, beside being water cooled c side is in this case cooled inside too, hav been modified per instructions in "The Hot F Bottle" in the December 1954 *CQ*. Despite critics who wrote in to say that this sys doesn't work here is an actual setup wh should prove to you that it is possible. A takes is a bit of imagination, that's all.

[*Continued on next page*]

. . . de W2NSD

[*from page 112*]



Here is W2NSD trying out the Hydropack. With this getup quite a bit of the beautiful coral growths surrounding the island were explored and many brilliantly colored fish were viewed.

MULTIPLE OPERATOR PHONE SCORES

[*Continued from page 100*]

All Band
W9AVJ 28,784

7 Mc
W9AVJ 756

14 Mc
W9AVJ 10,800

21 Mc
W9AVJ 1,107

Bulgaria

All Band
LZ1KDP 11,098

3.5 Mc
LZ1KDP 100

7 Mc
LZ1KDP 108

14 Mc
LZ1KDP 4,794

21 Mc
LZ1KDP 144

Ecuador

All Band
HC2JR 193,734
HC1MB 141,700

7 Mc
HC1MB 2,235
HC2JR 468

14 Mc
HC2JR 67,488
HC1MB 30,360

21 Mc
HC2JR 21,903
HC1MB 13,944

28 Mc
HC1MB 1,339

France

All Band
F7BM 208,725

3.5 Mc
F7BM 2,592

7 Mc
F7BM 4,320

14 Mc
F7BM 73,012

21 Mc
F7BM 1,728

Italy

All Band
I1BDV 93,288

3.5 Mc
I1BDV 1,587

7 Mc
I1BDV 1,254

14 Mc
I1BDV 33,210

21 Mc
I1BDV 1,738

Okinawa

14 Mc
KR6OO 12,364

Germany

14 Mc
DL1TA 61,418

A2 Code Practice Permission Proposed for Phone Bands

The FCC invites comments by Nov. 15 on the proposed rule, based upon coresrpondence from individual amateurs and from the ARRL, to amend Part 12 of the amateur radio service rules to specifically provide that tone-modulated code practice transmissions may be made on bands authorized for A3 emission, when interspersed with appropriate voice instructions.

LETTERS

[*from page 68*]

is not stable enough for good SSB reception. It is passable, but leaves a lot to be desired.

I am sorry that I cannot offer anymore on the receiver, but I don't believe there is a commercial mobile receiver available at the present time to permit proper reception of SSB.

I have been planning on constructing a receiver for this purpose, but other activity has prevented my spending time on this project.

Bill Johnson, W8VOK

Pasay City, Philippines

Sirs:

I am sending you herewith photographs which you may find of some interest in your magazine. These are copies of the official pictures of the longest total solar eclipse to occur in 1250 years and observed in the Philippines on June 20, 1955.

Radio signals were observed to fade out during the totality.

Mabuhay and with fraternal 73 to you all, I remain

Very sincerely yours,
Elpidio G. De Castro, DU1RTI
Secretary, Philippine Amateur Radio Assn.

NOVICE HELP WANTED

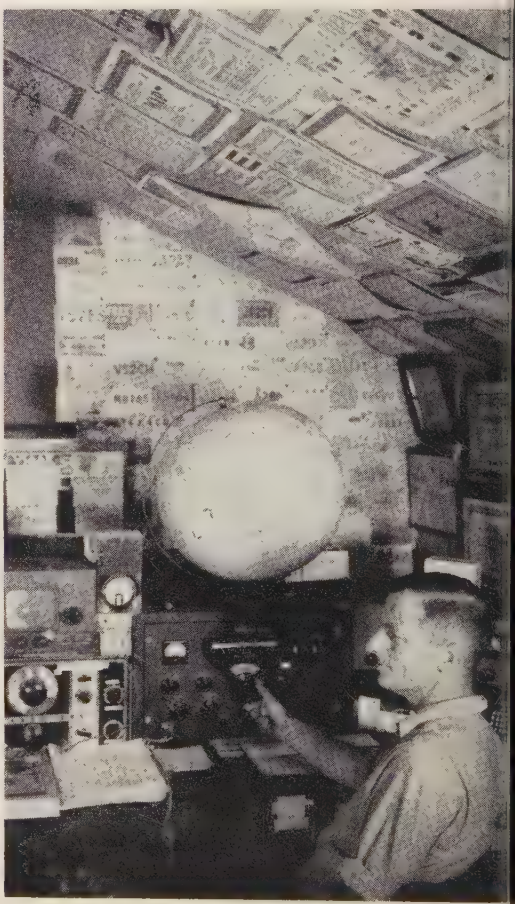
[*from page 87*]

Tom Nichols, c/o Chief Hotel, Newcastle, Wyoming says there aren't many hams around there and he could use some encouragement and help.

Walt Burdine, W8ZCV, R.F.D. #3, Waynesville, Ohio, needs help in getting ideas, hints, kinks and items of interest to all hams so that this column of ours will be more widely read by all hams and not just the novices. What do you technicians want here? I will include any news sent in by technicians about DX on 6 meters or 220 mc. or higher bands. Do YOU read NOVICE SHACK? Thank you.

73 for now. I will see you at the same news stand next month.

Help wanted items and news should be in hand by the 13th for next month's column. Send your items to Walt Burdine, W8ZCV, R.F.D. #3, Waynesville, Ohio.



CQ World Globe at shack of famous DX'er W2QHH. See Page 50.

Syracuse VHF Roundup

The Syracuse VHF Club holds a VHF Roundup Saturday, October 15, starting at 2 p.m., running till ? p.m. or a.m. Main speaker will be Art Koch, W2RMA, of G.E., whose many articles in *G.E. Ham News* (low noise converters, etc.) have stirred considerable interest. Early registration is advised. Tickets $2.50 each, covering cost of banquet and door prize. The Roundup will be held at Frank Taylor's, on N.S. route 11 in North Syracuse. Open to all with an interest in VHF, so bring the YL's and friends. Contact Joe Lando, K2JIM, RD #1, East Syracuse, N. Y. for tickets.

Free Novice Classes: Chicago

Now in progress are free Novice code classes sponsored by Allied Radio and conducted in their cafeteria Monday evenings from 7 to 9 p.m. People in all age groups are welcomed. Anyone interested can register in the Allied Ham Shack. Classes run thru November 28, 1955.

DID YOU KNOW that Columbus, Ohio, has a club of twenty-five Hams, all of them blind? Over half of them already have their licenses and are prepared to help in any emergency—fires, floods, blizzards. "Their ability to remember is uncanny," says William Jenney, the telephone-company engineer who singlehandedly is responsible. He conceived the idea of teaching the touch system to the boys at the Columbus State School for the Blind. All who wanted to learn were eligible.—*from The Mike and Key.*

PROPAGATION

[*from page 74*]

Work Plans

If you intend using the *Charts* as a guide during the Contest period, I would suggest that you re-arrange the forecast data into a "work plan" based upon your operating conditions. Correspondence received from several readers after previous Contests indicates that the "work plans" suggested in previous years were a big help to many operators in compiling high scores. The following is a "work plan" devised from the forecasts for 20-meter operation in New York City. The "plan" shows optimum times for working the maximum number of continents on 20-meters.

"20-Meter Work Plan For New York City"

Optimum Time (EST)	*Areas Workable*
0530-1100	Europe, North Africa, South America, South East Asia, Guam & Pacific, Japan and Far East.
1100-1900	Europe, Africa, Near & Middle East, South America.
1900-2100	South America, Australasia, Guam & Pacific.
2100-0300	South America.
0300-0530	No DX Activity Forecast.

[*Continued on next page*]

[*from preceding page*]

Similar "work plans" can be readily de vised from the *Propagation Charts* for othe QTH's and other operating conditions.

Post-Mortem

DX Contests, because of the large amoun of Amateur activity on the various band offers an excellent opportunity for checkin the accuracy of these forecasts. Based upo logs and other reception information receive after previous years' Contests we have been ab to modify certain basic ionospheric data t give us more accurate forecasts in certain area of the world. I would therefore appreciate an comments, based upon your observations du ing the 1955 Contest, regarding the accurac or inaccuracy, as the case may be, of thes forecasts.

Good luck to all of you during the Contes If time permits I am going to try to fire up m *Viking Ranger* for the Contest. Next month regular column will include a continuation o the "Review of Shortwave Propagation Fun damentals" with a discussion of some of th abnormal variations in the ionosphere.

DX NEWS

[*from page 79*]

present rig on SSB! . . . W6HZN who planne to be on as an ET3 is back home again due t contract differences. . . . Danny, VP2VB/ was given permission to use the call **KZ5D** during his Canal Zone stay. . . . Ray, EL2 ex-DL4EA/CE13BG/W8OFQ, sold his ge in Liberia and should be heard soon with a W or K2 call. From EL2X he amassed a total 219 countries and 35 zones. Heard at EL2

Honor Roll Endorsements

CW PHONE	ZS2AT 40-192	W3AXT 37-176
W1FH 40-262	W6LGD 40-178	W3WU 37-169
W6VFR 40-259	W6BUO 40-167	W9FNR 36-156
PY2CK 40-256	W6ID 40-164	W5FXN 35-177
W6ENV 40-256	W5ASG 39-251	PHONE ONLY
W6MX 40-253	W8KIA 39-246	PY2CK 39-239
W8PQQ 40-252	W9LNM 39-234	W6DI 39-212
W2AGW 40-251	VK4FJ 39-218	W6VFR 39-186
F8BS 40-234	W8UAS 39-219	W4HA 36-191
W5KC 40-232	W2HMJ 38-212	W5ASG 36-186
W9VND 40-210	OZ7BG 37-183	

Last complete HONOR ROLL appeared in the September iss

Next complete HONOR ROLL will appear in the January iss

on 160 during the Winter months we W2GGL, KP4KD, W9PNE, W8GDQ a W1BB. . . . DL4ZC has helped Fred, 9S4A to acquire an HT-18 VFO and Fred will be shortly with a 829-B final. . . . Pat, ex-W2A ZC8PM, KH6ARA, now keys from K6MI

at Sherman Oaks. . . . Joe, KP4RL, is now in W2-land and may get his call, W2DIN, back. . . . OD5AB has been receiving QSL for CW contacts. He has been off CW for two years! . . . Congratulations go to Mila and Mirko, YU1AD, who were married on July 23rd. Best man was George, YU1AG. This blissful state will not keep Mirko entirely off the air as he has just completed a "super-duper" rig with a pair of 6146's in the final! . . .

160 Meters

Stew, W1BB, reports that Summer tests have been maintained on this band with surprising results. Participating were G3JVI, G3GGN, G3ERN, W1BB, K2BWR, W3RGQ, W9NH and W9PNE. There were contacts during July as follows: K2BRW/G3GGN, W3RGQ/G3GGN, W1BB/G3JVI. This somewhat dispels the old bugaboo that 160 summer-time DX is an impossibility and results depend on QRN levels and time of day rather than seasonal considerations.

Addresses

KG4AV—Box 55, Navy 115, FPO N.Y.

OE13USA—West USA via W6HVN. East USA via K2IXD.

OY7ML—Box 184, Torshavn, Faroe Islands.

PX1EX/P—(F8EX-F8EO-F3IB-F9UK) via REF.

ST2AM—Amateur Radio Club, R.A.F. Khartoum, Sudan.

SU1IC—(From QSL) Ibrahim M. Charmy, 1, Mohamet Shukri Str. Agoza, Giza Egypt.

TI2WN—Walt Myers Jr. P.O. Box 94, Panamian Embassy, San Jose, C.R.

VK3FH—(New) D. D. Paine, Thames St., Frankston, Vic. Australia.

VP1EK—Dr. Ernie Kredel, The Hospital, El Cayo, British Honduras

VP7NG—(New) Box 37, Governors Harbour, Eleuthera, Bahamas.

VS4CT—Peter H. Green, SSL, c/o British Malayan Petroleum Co, Seria, Brunei.

W8VHR/4—John Young, Post Oak, Va.

exZB2D—G3HOP, 97 Stome Road, Stafford, Staffordshire, England.

ZS8L—Via ZS1PD.

Thanks to FOC Bulletin, West Gulf Bulletin, F9RS and W5CFG.

DX Interviews DE W4ZFE

(Courtesy West Gulf Bulletin)

CR9AH, John Alvares, care Radio Vila Verde, Macao, Portuguese China. . . . I became interested in ham radio about 1927 and in those days radio parts were very hard to procure in Hongkong and the best receivers had to be homemade. I first received my license in 1929 and was known as VS6AG. When the Japanese occupied Hongkong I came over to Macao. After the war I started up again as CR9AG. That lasted until 1950 dur-

[*Continued on next page*]

[*from preceding page*]

ing which time I worked plenty of DX, mostly on 28 Mc. phone. I have made WAC, WAS, WAZ, DXCC, WBE, BERT, RCC and the A1 Club. After this I closed down CR9AG and left Macao until 1952 for Hongkong again. Not long afterwards I was called back to Macao to start up Vila Verde Radio again. This I accepted and also applied for a ham ticket. This time I received the call CR9AH which I now hold. My hobby is ham radio but there hasn't been much doing lately as conditions have been so bad. Twenty meters is best and there are a few openings on 15. My present job here is Chief Engineer of the local BC station and I handle the commercials. This is a quiet place, more like a Summer resort, and very little business is done nowadays. We are about 40 miles west of Hongkong which is connected by a daily ferry service. Fireworks and matches are made here while the livelihood of the junk people is fishing. We have quite a few hurricanes here, mostly between July and September. My transmitter is a homemade affair and is VFO controlled with 100 watts on CW and phone. The receiver is an RCA AR-77 of ten tubes. The antenna is a long wire. I can mostly be found on the band between 1200 and 1700 GMT and when not on VFO I operate on the frequencies of 3505, 7010 and 14080 for CW and 14150 for phone. I have not heard any W's on ten meters lately but have had contacts with Africa, Europe and the Pacific on that band. So far I have worked 140 countries on the DXCC list. Quite a few Russian stations with three letter calls, beginning with "K" have been heard, mostly on 7 Mcs., working among themselves. CR9AF has left Macao for Lisbon and has taken all his gear with him. The only other station active here is CR9AI who stays on twenty meters. Now that fifteen meters is opening I will be looking for you fellows there. . . . 73's.

John, CR9AH

Jungle Expedition

During the latter part of October W4VDF and W4AMW will head another expedition into the wilderness of Nicaragua. They plan to equip an Army surplus aquatic Jeep or Duck to transport the expedition upon arrival at Bluefields. There are openings for FOUR hams. Those interested in this trip should contact W4VDF immediately. The "Duck" will be equipped with a VIKING II and 75A1 for all-band operation. The unique Christmas rites of the Tsuma Indians will be covered photographically and articles will be written for outdoor magazines. Here is a wonderful opportunity to be DX and hunt and fish in areas that have been totally unexplored. The expedition will last three months.

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Valley Electronic Supply Co.
1302 W. Magnolia Blvd.
Burbank
17647 Sherman Way
Van Nuys

Western Radio and TV Supply Co.
1415 India St.
San Diego 1

Zack Radio Supply
525 High St.
Palo Alto
1424 Market St.
San Francisco

COLORADO

Gibson Products Co.
1745 Arapahoe St.
Denver 2

Radio Products Sales Co.
1237 16th St.
Denver 2

CONNECTICUT

Bond Radio Supply
439 West Main St.
Waterbury

Hatry of Hartford, Inc.
203 Ann Street
Hartford 3

Radio Shack Corp.
230 Crown St.
New Haven

DELAWARE

Almo Radio Co.
1122 French St.
Wilmington

Delaware Electronics Supply Co., Inc.
205 W. 4th St.
Wilmington

Radio Electric Service Co.
3rd & Tatnall Sts.
Wilmington

Wilmington Electrical Specialty Co.
405 Delaware Ave.
Wilmington

DISTRICT OF COLUMBIA

Capitol Radio Wholesalers, Inc.
2120-22 14th St., N. W.
Washington, D.C.

Electronic Wholesalers, Inc.
2345 Sherman Ave., N. W.
Washington 1, D.C.

Kenyon Radio Supply Co.
2020 14th St., N. W.
Washington 9, D.C.

Sun Radio Co.
938 F Street, N. W.

Sun Parts Distributors Ltd.
514 10th St. N. W.
Washington 4

FLORIDA

Cooper Radio Co.
648 2nd Ave., South
St. Petersburg 5

Electronic Equipment Co., Inc.
2701 N. W. 42nd Ave.
Miami 48

Electronic Supply
61 N. E. 9th St.
Miami 32

East Coast Radio & TV Co., Inc.
1901 So. Dixie Hwy.
West Palm Beach
100 N.W. Miami Court
Miami

Flagler Radio Co.
1068 W. Flagler
Miami

Goddard Dist., Inc.
1309 N. Dixie Hwy.
West Palm Beach

Grice Radio Supply
300 E. Wright St.
Pensacola

Herman Radio Supply Co.
1365 N. W. 23rd St.
Miami 42

Kinkade Radio Supply
1707 Grand Central Ave.
Tampa
1354 Laura St.
Jacksonville

Thompson Appliance Co.
10 E. Fourth St.
Panama City

Thurow Distributors, Inc.
121 S. Water St.
Tampa

Walder Radio & Appliance Co.
1809 N. E. 2nd Ave.
Miami 32

GEORGIA

Electronic Distributors, Inc.
995 Riverside Drive
Macon

Radio Sales & Service
2000 12th Ave.
Columbus

Specialty Dist. Co., Inc.
425 Peachtree St., N. E.
Atlanta 3

IDAHO

Robbies Radio & TV Supply
4001 Hill Rd.
Boise

ILLINOIS

Atronic Corporation
6566 Sheridan Road
Chicago 26

Art A. Johnson Sales
1117 Charles St.
Rockford

Allied Radio Corp.
100 N. Western Ave.
Chicago 80

J. G. Bowman & Company
515 E. 75th St.
Chicago 19

H. & H. Electronic Supply
506 Kishwaukee
Rockford

Harold Bruce Distributors
1120 E. Capitol Ave.
Springfield

Klaus Radio & Electric Co.
403 E. Lake St.
Peoria

Lampley Radio Company
810 N. McLeansboro St.
Benton

Lurtz Electric Company
219-21 N. Illinois St.
Belleville

Newark Electric Co.
223 W. Madison St.
Chicago 6

Radio Doctor Supply House
892 W. Station
Kankakee

Selectronic Supplies, Inc.
803 South Adams
Peoria

INDIANA

Broadwin Television & Radio Co.
6547 Kennedy Avenue
Hammond

Castrup's Radio Supplies
1014 West Franklin St.
Evansville 10

M. H. Dossett Co.
855 Burlington Ave.
Frankfort

Graham Electronics Supply, Inc.
102 S. Pennsylvania St.
Indianapolis 4

Lafayette Radio Supply
408 North St.
Lafayette

Lakeland Radio Supply
Phone 70, W9FEI
Angola

Mobile Radio Supply Co.
507 N. Washington
Marion

Radio Distributing Co.
1212 South High St.
South Bend

Stansifer Radio Co., Inc.
1805 So. Walnut St.
Bloomington

Van Sickle Radio Supply
1320 S. Calhoun St.
Fort Wayne

IOWA

Bob & Jack's Store for Hams
611 Forest
Des Moines

Boe Distributing Co.
1605 Rockdale Road
Dubuque

Burghardt Radio Supply
Sioux City

Ken-Els Radio Supply
501 First Avenue, North
Fort Dodge

Radio Trade Supply Co.
1124 Grand Ave.
Des Moines

TCR Distributors
1205 East River Drive
Davenport

World Radio Laboratories, Inc.
3415 West Broadway
Council Bluffs

KANSAS

Acme Radio Supply
412 East 10th St.
Topeka

Amateur Radio Equipment Co.
1203 E. Douglas
Wichita

Four State Radio Supply Co.
Coffeyville

Overton Electric Co., Inc.
522 Jackson St.
Topeka

Western Distributors Radio & Supply Company
227 North Santa Fe
Salina

KENTUCKY

Radio Equipment Co.
480 Skain Ave.
Lexington

Universal Radio Supply Co.
533 South Seventh St.
Louisville 3

MAINE

Radio Supply Co., Inc.
26 Cross Street
Auburn

MARYLAND

Henry O. Berman Co., Inc.
10-12 East Lombard St.
Baltimore 2

Kann-Ellert Electronics, Inc.
9 South Howard St.
Baltimore 1

Radio Electric Service Co.
5 North Howard St.
Baltimore 1

Wholesale Radio Parts Co.
311 West Baltimore St.
Baltimore 1

MASSACHUSETTS

Cramer Electronics
811 Boylston St.
Boston 16

E. A. Ross & Co.
1663 Purchase St.

Radio Shack Corp
167 Washington
Boston

Radio Electronic
52 Chandler St.
Worcester

Springfield Radio
405 Dwight St.
Springfield

Young & Young of Inc.
262 Lowell St.
Lawrence

MICHIGAN

Bell-Lourim Electr
1845 Peck St.
Muskegon
Branch: Travers

C & S Electronic
758 East Wither
Flint 5

M. N. Duffy & Co
2040 Grand Rive
Detroit 26

Erickson Electron
Wholesale, Inc.
1201 Woodward
Ferndale

Purchase Radio S
605 Church St.
Ann Arbor

Reno Radio Comp
1314 Broadway
Detroit 26

Radio Parts, Inc.
542-8 So. Divis
Grand Rapids 3

Saginaw Distribu
1751 E. Genese
Saginaw

Tape Recording
3335 E. Michiga
Lansing

Warren Radio Co
713 Portage St.
Kalamazoo

MINNESOTA

Lew Bonn Co.
67 So. 12th St.
Minneapolis 3
Branches: St. Pa
Fargo,

Electronic Center
107 3rd Ave., N
Minneapolis

Gopher Electroni
370 Minnesota S
St. Paul

Hall Electric Co.
566 N. Robert
St. Paul

Northwest Radio
123 East First S
Duluth 2

Northwest Radio Supply
52 So. Twelfth S
Minneapolis 3

Harry Stark's, In
71 So. 12th St.
Minneapolis 3

MISSISSIPPI

Nelson Radio & S Inc.
613 Caillevet St
Biloxi

Swan Distributin
342 N. Gallatin
Jackson
P. O. Box 766
506 Bouie St.
Hattiesburg
P. O. Box 824
724 Fifth St. So

OURI
r Ashe Radio Co.
Pine St.
Louis
Radio Co.
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Grand Ave.
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Pine St.
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TANA
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Box 966
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Eleventh St. West
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ASKA
Elec. Supply Corp.
O St.
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HAMPSHIRE
Radio, Inc.
Box 312
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JERSEY
Radio Co.
Haddon Ave.
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Ventnor Ave.
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& Hurley
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Route 22
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& Penn Sts.
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Wire Television, Inc.
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Shrewsbury Ave.
Bank
Electric Service Co.
J.
Cooper St.
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Broad St.
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Woodbridge Ave.
Brunswick
Wholesale Radio, Inc.
Teaneck Road
efield Park

MEXICO
Engineering
Box 2
lamos
r Radio Co., Inc.
Granite Ave., N.W.
Box 921
uquerque

YORK
Electronics, Inc.
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York 7
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Vest Main St.
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Berndt
S. Warren St.
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Electronics, Inc.
Bridge St.
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, Inc.
2335 Main St.
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ange Radio Dist. Co.
16 Broadway
k 7

Harrison Radio Co.
225 Greenwich St.
New York
144-24 Hillside Avenue
Jamaica, Long Island
Harvey Radio Company
103 West 43rd Street
New York 36
Hudson Radio and Television Co.
48 W. 48th St.
New York
Lafayette Radio
Radio Wire Television, Inc.
100 Sixth Avenue
New York 13
Morris Distributor Co.
1153 W. Fayette St.
Syracuse
Peerless Radio Dist., Inc.
92-32 Merrick Road
Jamaica 2
Rochester Radio Supply
600 Main St. East
Rochester 6
Radio Equipment Corp.
312 Elm St.
Buffalo
Radelco, Inc.
246 West First St.
Mount Vernon
Standard Parts Corp.
277 North Franklin St.
Hempstead
Mont. Hwy. & Intersection of Blue Point Ave.
Blue Point, Long Island
Syracuse Radio Supply, Inc.
620 S. Salina St.
Syracuse 3
Stallman of Ithaca
123 S. Tioga St.
Ithaca
Terminal Radio Corporation
85 Cortlandt St.
New York
Westchester Electronic Supply Co., Inc.
602-610 Mamaroneck Avenue
White Plains

NORTH CAROLINA
Allied Electronics, Inc.
413-415 Hillsboro Street
Raleigh
Dalton-Hege Radio Supply Co.
912 West 4th Street
Winston-Salem
Freck Radio & Supply Co. Inc.
38 Biltmore Ave.
Asheville
Radio Equipment Co.
306 Cotanche St.
Greenville
Shiflet & Dickson, Inc.
1008 W. Franklin Ave.
Gastonia

NORTH DAKOTA
Fargo Radio Service Co.
515 Third Avenue North
Fargo
Maytag Electric Co.
P. O. Box 672
Minot
Mandan Electric Supply
101 East Main St.
Mandan

OHIO
Burroughs Radio Inc.
711 Second St., N.W.
Canton 3
218 E. Second Street
Mansfield
H. & W. Auto Accessories
715 Adams St.
Toledo 2
Lifetime Electronics
1501 Adams St.
Toledo 2
Mytronic Co.
2145 Florence
Cincinnati 6
Pioneer Electronic Supply Co.
2115 Prospect Ave.
Cleveland 15
Progress Radio
413-415 Huron Road
Cleveland 15
Ross Radio
325 W. Federal St.
Youngstown 3
Radio & Electronic Parts Corp.
3235 Prospect Ave.
Cleveland 15
Sun Radio
110 East Martin St.
Akron
Selectronic Supplies, Inc.
1320 Madison Ave.
Toledo
Steinbergs, Inc.
633 Walnut St.
Cincinnati 2
Srepco
314 Leo Street
Dayton 4
Universal Service
114 North Third Street
Columbus 15

OKLAHOMA
Radio Supply Inc.
724 N. Hudson
P. O. Box 1972
Oklahoma City
Radio, Inc.
1000 South Main St.
Tulsa

OREGON
Portland Radio Supply
1234 S. W. Stark
Portland 5
United Radio Supply Inc.
22 Northwest 9th
Portland
712 W. 6th St.
Eugene
697 South 12th St.
Salem
301 South Front St.
Medford
Verl G. Walker Co.
205 West Jackson
P. O. Box 1586
Medford

PENNSYLVANIA
AG Radio Parts Co.
939 Township Line Road
Elkins Park
Almo Radio Co.
509 Arch St.
Philadelphia
A. C. Radio Supply Co.
126 East 24th St.
Chester
1539 West Passyunk Ave.
Philadelphia, Pa.
George D. Barbey
155-157 Penn Street
Reading
622 Columbia Ave.
Lancaster
Consolidated Radio Co.
612 Arch St.
Philadelphia 6
Cameradio Co.
1121 Penn Ave.
Pittsburgh 22
D & H Distributing Co.
2535 N. 7th St.
Harrisburg
Federated Purchaser
1115 Hamilton St.
Allentown
General Radio & Elec. Co.
396-398 S. Main St.
Wilkes-Barre
Lectronic Research Labs
715 Arch St.
Philadelphia 6
Moyer Electronics Supply Co., Inc.
330 Norwegian St.
Pottsville
Radio Electric Service Co. of Pa., Inc.
701 Arch St.
Philadelphia 6
Radio Service Co.
346 So. Main St.
Wilkes-Barre
Scranton Radio & TV Supply Co.
419 Poplar St.
Scranton 9
Tydings Company
630 Grant St.
Pittsburgh 19
5930 Baum Blvd.
Pittsburgh 6
Eugene G. Wile
218 South 11th St.
Philadelphia 7

RHODE ISLAND
W. H. Edwards Co., Inc.
94-96 Broadway
Providence 3

SOUTH CAROLINA
A & S Electronics, Inc.
River Street at Murray Ave.
Anderson
Dixie Radio Supply Co.
1700 Laurel St.
Columbia
Florence Radio Supply, Inc.
355-65 North Irby Street
Florence

SOUTH DAKOTA
Burghardt Radio Supply, Inc.
Watertown, Aberdeen, Rapid City

TENNESSEE
Bluff City Dist. Co.
Memphis
Curle Radio Supply
439 Broad Street
Chattanooga 2
Electra Distributing Co.
1914 West End Ave.
Nashville 4
L. K. Rush Company
101-103 Highland Ave.
Jackson
W & W Distributing Co.
644 Madison Ave.
Memphis

TEXAS
Busacker Electronic Equip. Co.
1216 W. Clay Ave.
Houston 19
Crabtree's Wholesale Radio
2608 Ross Ave.
Dallas 1
Electronics Equipment Co.
917 Florence St.
Fort Worth
Lamp's 'Lectronics Ltd.
828 Brooklyn
San Antonio 10
C. C. McNicol
811 Estrella St.
El Paso
Rio Radio Supply Co.
McAllen
RC & LC Hall
1219 Caroline
Houston
1141 Park Ave.
Beaumont
Swieco, Inc.
512-18 E. Lancaster
Fort Worth
Texas Electronic Supply
1202 W. 5th St.
Austin

UTAH
Standard Supply Co.
225 E. 6th South
Salt Lake City

VIRGINIA
Bristol Radio Supply Corp.
31 Moore Street
Bristol
Radio Equipment Co.
821 W. 21st St.
Norfolk
Radio Supply Co.
3302 W. Broad St.
Richmond
Southern Electric Corp.
818 Greenville Ave.
Staunton

WASHINGTON
C & G Radio Supply Company
1303 Pacific Avenue
Bremerton
318 North Capitol Way
Olympia
510 West Wishkah
Aberdeen
2502 Jefferson
Tacoma
Northwest Electronics
N. 102 Monroe St.
Spokane 1
Pacific Electronics Sales Co.
1209 1st Ave.
Seattle 1
Seattle Radio Supply
2117 Second Ave.
Seattle
Waitkus Supply Co.
110 Grand Ave.
Bellingham

WEST VIRGINIA
Chemcity Electronic Dist.
1637 Fourth Ave.
P.O. Box 2066
Charleston

WISCONSIN
A & F Electro-Mart
7833 W. Greenfield Ave.
Milwaukee 14
Bushland Radio Specialties
9 W. Spring St.
Chippewa Falls
Harris Radio Corporation
111 No. 10th Street
Manitowac
289 No. Main St.
Fond Du Lac
Satterfield Electronics Inc.
326-28 W. Gorham St.
Madison 3
Valley Radio Distributors
518 N. Appleton St.
Appleton

ALASKA
Yukon Radio Supply, Inc.
Box 406
Anchorage

HAWAII
Radio Wholesale & Supply
P. O. Box 3768
Honolulu 11

CANADA
Alpha Aracon Radio
29 Adelaide St. West
Toronto, Ontario
Anguish Limited
Brantford, Ontario
Crawford Radio
119-121 John St. N.
Hamilton, Ontario
Johnson Electric Supply
135 McIntyre St.
North Bay, Ontario
Geo. M. LaTour
1540 — 3rd Ave.
Quebec City, P. Q.
MacDonald Electric Ltd.
307 Queen St. South
Kitchener, Ontario
Payette Radio Ltd.
730 St. James W.
Montreal, P. Q.
Edwads Sudbury Ltd.
69 Elm Street West
Sudbury, Ontario
Taylor & Pearson (B.C.) Ltd
1006 Richards St.
Vancouver 2, B. C.
The Radio Centre
72 Craig St. W.
Montreal, P. Q.
Wholesale Radio & Electronics
1143 Bay St.
Toronto, Ontario
Phonovision Dist. Co.
388 King St.
Kingston, Ontario
Fisher Radio Company
649 Colbore St.
London, Ontario
Wackide Radio TV Labs Ltd.
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Ottawa, Ontario

Complete Specifications and Features NC-300

Features the *greatest sensitivity* of any ham receiver at any price (3-6 db noise figure on all amateur bands) plus... *greater stability* than most receivers costing $695... *plus* all these sensational new features and priced at only $349.95!†

NEW! Features a total of *10* dial scales for coverage of 160 to 1¼ meters with National's *exclusive* new converter provision with the receiver scales calibrated for 6, 2, 1¼ meters using a special 30-35 mc tunable IF band.

NEW! Longest slide rule dial ever! More than a foot long! Easily readable to 2 kc without interpolation up to 21.5 mc.

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NEW! Separate linear detector for single sideband . . . decreases distortion by allowing AVC "on" with single sideband . . . will not block with RF gain full open.

NEW! Hi-speed, smooth inertia tuning dial with 40 to 1 ratio! Provides easier, more accurate tuning. Smoothest dial you've ever used.

NEW! Exclusive optional RF gain provision for best CW results allows independent control of IF gain!

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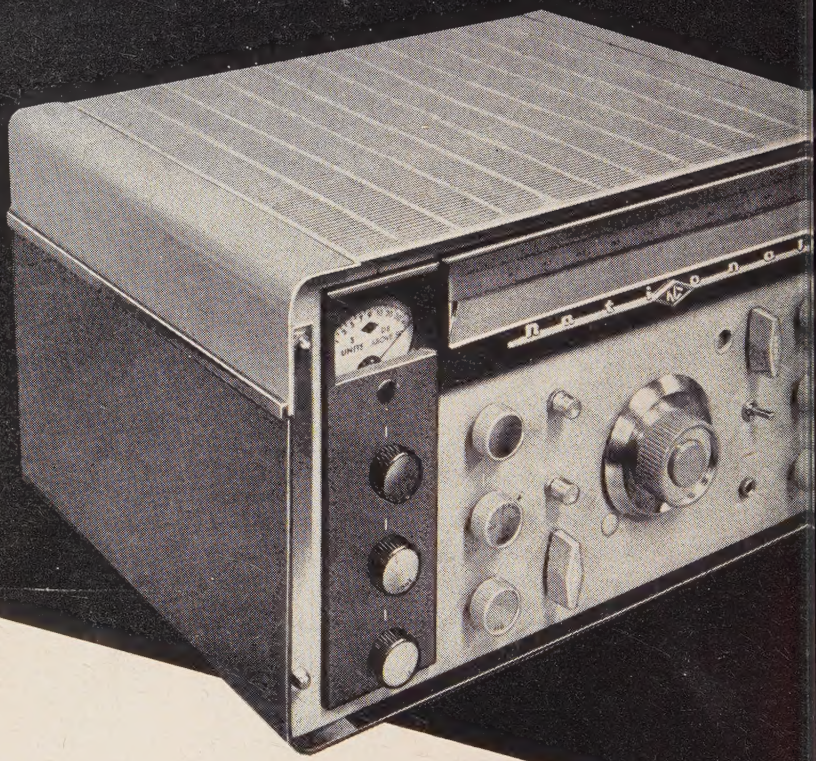

NEW! Giant, easy to read, "S" meter!

NEW! Provision for external control of RF gain automatically during transmitting periods.

NEW! Muting provision for CW break-in operation.

PLUS—the newest look in ham receivers . . . "Massive in the modern manner" . . . truly a "dream receiver" that can be used either as a table or rack model!

PLUS—all these other sensational National features:

★—Calibration reset adjustable from front panel to provide exact frequency setting!

★—Dual conversion with better than 50 db primary image rejection on all amateur bands, plus better than 60 db secondary image rejection!

★—Xtal filter with phasing control and 3 position band width control!

★—Wide range tone control—for control of both low frequency and high frequency end of response curve!

★—Socket for Xtal calibrator plus accessory socket for powering converters and future accessories!

★—1st IF frequency—2215 kc

★—2nd IF frequency—80 kc

ALL THE FEATURES MOST HAMS WANT... AT A PRICE MOST HAMS ARE WILLING TO PAY..

$34

amateur n

From *thousands of different suggestions*—submitted by amateurs themselves in a world-wide contest—a distinguished panel of experts picked the best. Now, in **THIS RECEIVER**—the NC-300—National presents the most desirable features from the tho sands of ideas received.

• Check these features. Are they what *you* want most in a receiver? Check the price. N before so much of what's "r wanted" for so little.

† *Prices slightly higher west of the Mississippi and outside Continental*

EPTEMBER 30

SEE *National's Brand New* NC-300 *dream receiver*

ow, for the biggest thrill,
k the *performance*. The
300 is at your local National
ıpany dealers' right now
ɔt. 30).

★—Selectivity at 6 db down 500 cycles, 3.5 kc and 8 kc. Selectable from the front panel without additional accessories! Nothing extra to buy!

★—Crystal filter at 2215 kc provides notching plus 3 bandwidth positions in addition to the 3 IF selectivity positions. No other receiver has this versatility.

★—14 controls:
RF gain and AC on/off
AF gain and RF tube gain switch
Tone control
AM-CW-SSB accessory switch
CW on/off pitch
Main tuning
Calibration correct
Xtal calibrator on/off
On/off limiter
IF selectivity
Xtal selectivity
Xtal phasing
Bandswitch
Phono-jack

★—10 tubes, plus 4H4-C current regulator, 5Y3 rectifier and 0B2 voltage regulator.

★—Tube complement
6BZ6 RF
6BA7 1st mixer
6AH6 1st osc.
6BE6 2nd mixer
6BJ6 1st I.F.
6BJ6 2nd I.F.
6AL5 ANL and detector
6BE6 CWO/SSB det.
12 AT7 1st audio and S meter amp.
6AQ5 audio output

★—Power consumption 60 watts

★—Power output 1 watt undistorted

★—Power source 110-120 volts AC, 60 cycles

★—Antenna input impedance 50-300 ohms

★—Output impedance—8 ohms

★—Tuning system combination gear-pinch

★—Band designation and length—
160 meters—1.8 to 2.0 megacycles
80 meters—3.5 to 4.0 megacycles
40 meters—7.0 to 7.3 megacycles
20 meters—14.0 to 14.4 megacycles
15 meters—21.0 to 21.5 megacycles
11 meters—26.5 to 27.5 megacycles
10 meters—28.0 to 29.7 megacycles
6 meters—49.5 to 54.5 megacycles*
2 meters—143.5 to 148.5 megacycles*
1¼ meters—220 to 225 megacycles*
* Usable with accessory converters optional at extra cost.

★—Frequency response—200 to 3,000 cycles for communications purposes

★—Shipping weight—60 lbs

★—Finish—two-tone gray enamel

★—DIMENSIONS:
19¼" Wide (19" rack out of cabinet) 11¼" High 15" Deep

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NATIONAL COMPANY, INC.
61 SHERMAN ST., MALDEN 48, MASS.

National NC®

New Hallicrafters SX-100
Communications Receiver

LEADING AMATEUR DESIGN:
. . . Use RCA Tubes

And the new Hallicrafters SX-100 is another example.

Featuring such modern circuitry as double I-F conversion and single-sideband reception, the SX-100 is the newest addition to the Hallicrafters line that has been making communications history on the amateur bands for many years.

In this fine receiver, as in many other leading amateur and commercial designs, *RCA Receiving Tubes* are specified—because the tests of time have proved that RCA Receiving Tubes can really *take it* in day-in and day-out operation. High uniformity of characteristics makes it possible to interchange them—no matter where or when you buy them—without a lot of circuit readjustment. RCA Receiving Tubes help with greater background *quietness* enabling you effectively to boost receiver sensitivity without "knocking out" the signal.

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